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NEW SOUTH WALES.

DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

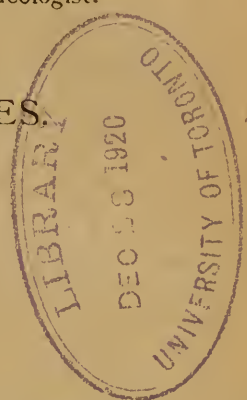
E. F. PITTMAN, A.R.S.M., Government Geologist.

Engineering

ENGINE STORAGE

MINERAL RESOURCES.

No. 20.



REPORT

UPON

THE ARDLETHAN TINFIELD.

BY

J. R. GODFREY, B.A.,

Inspector of Mines.



SYDNEY: WILLIAM APPLIGATE GULLICK, GOVERNMENT PRINTER.

1915.

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LETTER OF TRANSMITTAL.

Department of Mines,
Sydney, 11th November, 1915.

Sir,

I have the honor to submit for publication pamphlet number 20, of the Mineral Resources series, being a report on the Ardlethan Tinfield, by Mr. J. R. Godfrey, B.A., Inspector of Mines.

A great deal of uncertainty has existed in the minds of the public in regard to the value of the Ardlethan tin deposits, owing to the conflicting reports on the field which have appeared in the newspapers from time to time. It was, therefore, considered advisable to have a systematic examination and sampling of the various occurrences, and this has been very carefully carried out by Mr. Godfrey, who devoted some months to the work. The samples thus taken were assayed in the Departmental laboratory, and the results add considerably to the interest of Mr. Godfrey's comprehensive report, which it is hoped will be found to be of some practical use to mining men.

I have the honor to be,

Sir,

Your obedient servant,

EDWARD F. PITTMAN,
Government Geologist.

The Hon. John Estell,
Minister for Mines.



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REPORT

UPON

THE ARDLETHAN TINFIELD.

BY

J. R. GODFREY, B.A., Inspector of Mines.

THE Ardlethan Tin Field is situated near a township and railway station of the same name, on the Temora-Barellan line, about 41 miles west of Temora, and 261 miles west-south-west from Sydney, in the counties of Bourke and Cooper.

Tin was first discovered at the White Crystal and Carpathia Mines, about 3 miles north-west from Ardlethan township, and proved to be phenomenally rich, causing a wild boom, in which hundreds of leases were taken up, many of them containing no minerals of any economic value. Several of the prospectors, most of whom had no experience in tin, could have sold their leases advantageously, but were carried away by the prevailing excitement and lost their opportunities through asking excessive prices, while some of the mines which were floated were so over-capitalised that they are likely to be severely handicapped by this cause alone.

Altogether, the boom was an unfortunate incident in the history of the field, and has injured its progress to a most serious extent.

Matters are now nearer normal, and the field is supplied with several crushing plants; but the season has been an unusually dry one, and want of water has prevented the treatment of the few parcels of ore raised by the owners of claims outside of the companies mines, and, until a heavy fall of rain occurs, it is unlikely that the mines will show much activity.

The bulk of the leases on this field are situated in a belt of biotite-granite, running approximately north and south, and intruding sedimentary schists, locally termed slates. This granite belt is about 12 miles long and 4 miles wide, and is traceable from the Bald Hill at the extreme south end, through Mount Charles and Taylor's Hill to Dumbrell's Bygoo at the extreme north end, and tin has been found in different localities from end to end of this belt. Bald Hill lies almost exactly due south of the poppet heads of the Wild Cherry lease, which is situated in about the centre of the field.

The granite is usually pale pink, but considerable areas are white, the colour being due to the felspar, of which the crystals are generally large and well defined. Tourmaline is often present, and in some of the finer-grained granites is found in nodules in conjunction with quartz and greisen, probably due to magmatic segregation.

The granite is traversed by joints and heads along which "greisenization" and "tourmalinization" have occurred, and it is in this altered rock that the principal deposits of tin have been found. Sometimes the felspar on either side of this alteration has become kaolinised for a little distance, and carries tin, generally in unpayable quantities, but I failed to discover any cases of tin in the primary granite, with one possible exception at Bald Hill. It can therefore be taken as axiomatic that the tin on this field is of secondary origin.

In a few isolated cases "topazisation" has occurred. Instances of this can be seen on the Killarney, the Outcast, the Black and White, and the White Crystal leases. In fact, the Killarney lease obtained its name from an outcrop of topaz granite of a pale-blue colour.

The occurrence of topaz is well known both at the Bischoff Mine in Tasmania and in Cornwall, and in both places is more common than in Ardlethan.

The alteration of the granite has been the normal one of replacement of felspar by sericite, topaz, and tourmaline.

The miners frequently speak of elvan, usually applying this term to outcrops of quartz-tourmaline, but the only place on the field where any true porphyry can be seen is on the Carpathia hill, where a dyke or series of dykes is traceable on the surface. One of these can be traced in a north-north-westerly direction from the neighbourhood of the No. 2 shaft on the Carpathia lease, past the benzoline store, and disappears under the schists at the top of the hill. Another outcrop, in the Champion lease, runs due west past the dump of the big open cut; while a third and very prominent one starting near the Homeward Bound shaft runs north-north-west to near Wallis' No. 1 shaft, then turns north-east and travels along the west flank of the hill for about 250 feet, where it dips under the surface and disappears, the hill tapering out with it. (See drawing No. 8.)

What influence this dyke may have had on the deposition of the tin in the Carpathia hill it is impossible to say in the present stage of development, but this section of the field contains nearly all the richer and more important mines in the district.

In much of the granite on the Carpathia hill there is very little mica visible, and this is frequently spoken of and considered as porphyry, but microscopic examination has proved it to be in all cases a true granite.

It is outside the province of this report, which deals primarily with economic considerations, to discuss its geological aspects in detail, but Mr. Card, the Curator of the Mineralogical Museum, kindly cut and examined many rock sections for me, and his report on these shows a remarkable analogy to the rock sections of the tin-bearing granites of Cornwall as described in "The Geology of the Country around Bodmin and St. Austell," by W. A. E. Ussher, G. Barrow, and D. A. Macalister, to which the reader is referred.

The tin oxide is frequently associated with bismuthinite and bismuth ochre, molybdenite, wolfram, chalcopyrite, mispickel, cerussite, pyromorphite, and zinc-blende. In many parts of the field a greenish-yellow stain was observed, which Mr. Card identified as a hydrous arsenate of copper and

iron. It had already been noticed by the Under Secretary for Mines. Its chemical composition has now been accurately determined, and is as follows:—

| | |
|--------------------------------------|-------|
| H ₂ O..... | 12.32 |
| As ₂ O ₅ | 35.52 |
| Cu O..... | 19.15 |
| Fe ₂ O ₃ | 22.27 |
| B ₂ O ₃ | 0.06 |
| Si O ₂ (sol)..... | 0.30 |
| Al ₂ O ₃ | 2.11 |
| Ca O..... | 0.98 |
| Mg O..... | 0.06 |
| P ₂ O ₅ | trace |
| Gangue..... | 7.64 |

100.41

Soluble in HCl.

The best example of its occurrence is at the Welcome Stranger lease, where masses of tourmaline from No. 1 shaft are stained a bright greenish yellow.

Much of the tin ore is therefore very dirty, and some of the concentrates will probably require to be roasted to bring the tin concentrates to a marketable condition, especially when the ore is mined from the deeper and unoxidised levels.

The two principal gangues associated with the ore are a rock consisting essentially of quartz-tourmaline (which I propose to refer to in future as a quartz-tourmaline rock) and greisen.

The quartz-tourmaline rock often occurs either in a network of veins or as large and massive outcrops in barren pink biotite granite, from which it is separated by a sharp but often irregular line of demarcation between the two rocks. The Empire lease is a good instance of the former, and the Lone Hand and parts of the Outcast leases of the latter mode of occurrence. (See drawings Nos. 3 and 16.)

This rock appears to be an altered granite, in which the felspar has been completely replaced by silica, almost entirely destroying its original granitic character. From the fact that it does not merge into the surrounding granite it would seem to be of a later origin.

The greisen is usually found along the joints and heads in the granite, and varies considerably in character, ranging from almost pure quartz to almost pure mica. The joints in the granite often show a seam of tourmaline on the face of the fracture, passing thence into quartz-tourmaline rock, thence to greisen, gradually merging into unaltered granite. These joints often run for considerable distances, and the altered belt of rock on either side being clearly distinguishable in colour from the enclosing granite, is usually spoken of as a lode.

On the lease of the Bald Hill Syndicate, these so-called lodges are innumerable, but unfortunately the tin only occurs in isolated patches. Sometimes, as in the case of Wall's Maratholi lease, at Bald Hill, the joints are so close together that the alteration has extended through from one to the other, forming a belt of greisen up to 60 feet in width.

At the Southern Cross lease, and part of the Champion lease, tin has been found in the schists.

At the Black and White and the Needlewood leases, and at Kenny's abandoned shaft at Bald Hill, it is disseminated through large basins of decomposed kaolinized granite.

At one part of the Carpathia lease (No. 4 shaft), and at Frew's lease at Bald Hill, it occurs on the contact of the granite and schists, in a brecciated mixture of the two rocks.

The types of tin-bearing rock may, therefore, be classified as:—

1. Quartz-tourmaline rock. Examples, Coote's Lone Hand, Big Bygoo.
2. Greisen and greisenized granite. Examples, Wall's Maratholi Mine, Black and White, Bald Hill Syndicate.
3. Decomposed kaolinized granite. Examples, Black and White, Needlewood.
4. Contact brecciated granite and schists. Examples, Carpathia No. 4 shaft, Frew's Mine.
5. Schists. Examples, Southern Cross, Champion open-cut.

The Carpathia Hill and its neighbourhood seem to have been the principal focus of precipitation of the tinstone, and the mines from this locality have produced the bulk of the ore which has been obtained, and are likely to do so in the future.

The tin itself occurs almost entirely in pipes, pockets, patches, and bunches, the mode of occurrence being largely determined by the nature and frequency of the joints in the rock. Where these joints intersect, the ore will usually occur in a pipe between them. Where a joint splits in two and comes together again, it will be found in the lens enclosed by the two branches. Where there is only one joint, the tin will be frequently faced on the joint, with the surrounding rock sometimes barren, and at other times carrying bunches and irregular deposits of ore, the extent of which is often determined by causes which are obscure.

Clay seams of considerable thickness frequently cut across the granite and lode without displacing the latter, and although these seams are evidence of considerable movement, the tin does not follow them.

Although there are too many exceptions to warrant any rule being adopted as to the strike and dip of the tin deposits, the majority of quartz-tourmaline veins strike more or less north and south, and dip west from 70 degrees to 80 degrees. The Wild Cherry Mine is an exception, as the ore in Smith's shaft dips east. In my opinion there are no true fissures on the field. The Homeward Bound and Wild Cherry most nearly resemble fissures, but will probably prove to be minor joints.

From the nature of the deposits, it follows that the extent of any ore body will be more or less limited, and the estimation of tonnages a matter of uncertainty.

The mines at Ardeethan fall naturally into four main groups—

- I. THE BYGOO GROUP.
- II. THE CARPATHIA GROUP.
- III. THE TAYLOR'S HILL GROUP.
- IV. THE BALD HILL GROUP.

The mines in each group which were sampled or examined by me were as follow, those which were sampled being marked by an "s":—

I. BYGOO GROUP.

| | | | |
|----------------------------|------------------------|---------------|----------------|
| 1. Dumbrell's Bygoo..... | (s) P.M.L. 10 | Parish Ramsay | County Bourke. |
| 2. Murphy's Lease..... | (s) M.L. 2..... | " " | " " |
| 3. Corner's Lease | (s) M.L. 1..... | " " | " " |
| 4. Schulz's Lease | (s) M.L. 5..... | " " | " " |
| 5. The Needlewood Lease | (s) M.L. 7..... | " " | " " |
| 6. The Bulgarian Lease... | (s) P.M.L. 11 | Valgogoring | Cooper. |
| 7. The Empire Lease ... | (s) P.M.L. 3..... | " " | " " |
| 8. Clarke's Lease | (s) P.M.L. 1..... | " " | " " |
| 9. Watson's Lease..... | P.M.L. 22 | " " | " " |
| 10. Trembath's Lease | P.M.L. 6..... | " " | " " |
| 11. Drumlish Hill Lease... | P.M.L. 4..... | " " | " " |
| 12. Temora Syndicate..... | (s) M.L. 11 | Ramsay | Bourke. |
| 13. Big Bygoo | (s) P.M.L. 51 | " " | " " |
| 14. Coote's Lone Hand ... | (s) P.M.L. 25 | " " | " " |
| 15. The Leviathan | (s) P.M.L. 15 | " " | " " |
| 16. The Titanic | (s) P.M.L. 23 | " " | " " |
| 17. The Killarney | (s) P.M.L. 32-33 | " " | " " |
| 18. McDermott's | (s) P.M.L. 57 | " " | " " |
| 19. Ward and Mahony's... | (s) P.M.L. 71 | " " | " " |
| 20. Rob Roy..... | (s) P.M.L. (no number) | " " | " " |
| 22. Buchanan's Lease | (s) P.M.L. (no number) | " " | " " |
| 21. The Vulcan | P.M.L. 16 | " " | " " |

II. CARPATHIA GROUP.

| | | | |
|---------------------------------|---------------------|--------------|----------------|
| 1. The Carpathia Tin Mine. | (s) P.M.L. 4 | Parish Warri | County Bourke. |
| 2. The White Crystal Tin Mine. | P.M.L. 2, 3, and 11 | " " | " " |
| 3. The Wild Cherry Tin Mine. | P.M.L. 1, 3, 6, 9 | Ramsay..... | " " |
| 4. The Homeward Bound | (s) P.M.L. 2..... | " " | " " |
| 5. Wallis' Leases | (s) P.M.L. 11, 12 | " " | " " |
| 6. Ardlethan Options ... | (s) P.M.L. 8 | Warri | " " |
| 7. The Champion ... | (s) P.M.L. 1 | " " | " " |
| 8. The Southern Cross ... | P.M.L. 19, 20 | " " | " " |
| 9. Reynold's Lease | P.M.L. 7 | " " | " " |
| 10. Jackson's Lease (alluvial). | (s) P.M.L. 16 | " " | " " |

III. TAYLOR'S HILL GROUP.

| | | | |
|---------------------------|----------------------------|--------------|----------------|
| 1. The Welcome Stranger | (s) P.M.L. 67 | Parish Warri | County Bourke. |
| 2. The Outcast | (s) P.M.L. 37 | " " | " " |
| 3. The Commonwealth ... | P.M.L. 66-81, 82, 93, 110. | " " | " " |
| 4. The Perseverance | (s) P.M.L. 83 | " " | " " |
| 5. The Kia-ora | (s) P.M.L. 46 | " " | " " |
| 6. The Austral | (s) P.M.L. 80 | " " | " " |
| 7. The Black and White | (s) P.M.L. 53, 54, 55, 56 | " " | " " |
| 8. The Currajong | P.M.L. 76 | " " | " " |
| 9. McRae's Lease | P.M.L. 65 | " " | " " |
| 10. Williat's Lease..... | Authority to enter, 1,159. | " " | " " |

IV. BALD HILL GROUP.

| | |
|---|------------------------------------|
| 1. Bald Hill Syndicate ... (s) P.M.L. 3..... | Parish Walleroobie, County Bourke. |
| 2. Wall's Maratholi Lease (s) P.M.L. 14 | " " " " |
| 3. Freeman's Lease..... (s) P.M.L. 12 | " " " " |
| 4. Rancho Syndicate ... (s) M.L. 2..... | " " " " |
| 5. Fisher's Lease | P.M.L. 2, & M.L. 4 " " " " |
| 6. Frew's Lease | (s) P.M.L. 15 and 16... " " " " |
| 7. Kenny's abandoned (s) shaft. | " " " " |

UNCLASSIFIED.

1. Matheson's Lease (s) Authority to enter, Parish North Bolero, County Cooper, 1,261 Coota. por. 56.

I.—BYGOO GROUP.

1. *Dumbrell's Bygoo.*

P.M.L. 10, Parish Ramsay, County Bourke. 15 acres 2 roods 27 perches. Samples, 102-108. (See No. 1 drawing.)

This mine is on the north side of a travelling stock route, about 9 miles north-west of Ardlethan.

The workings are on the north-east face of a granite knob, and the occurrence of the tin is essentially pocketty, being found in patches of quartz-tourmaline rock and greisen along heads and joints in the granite.

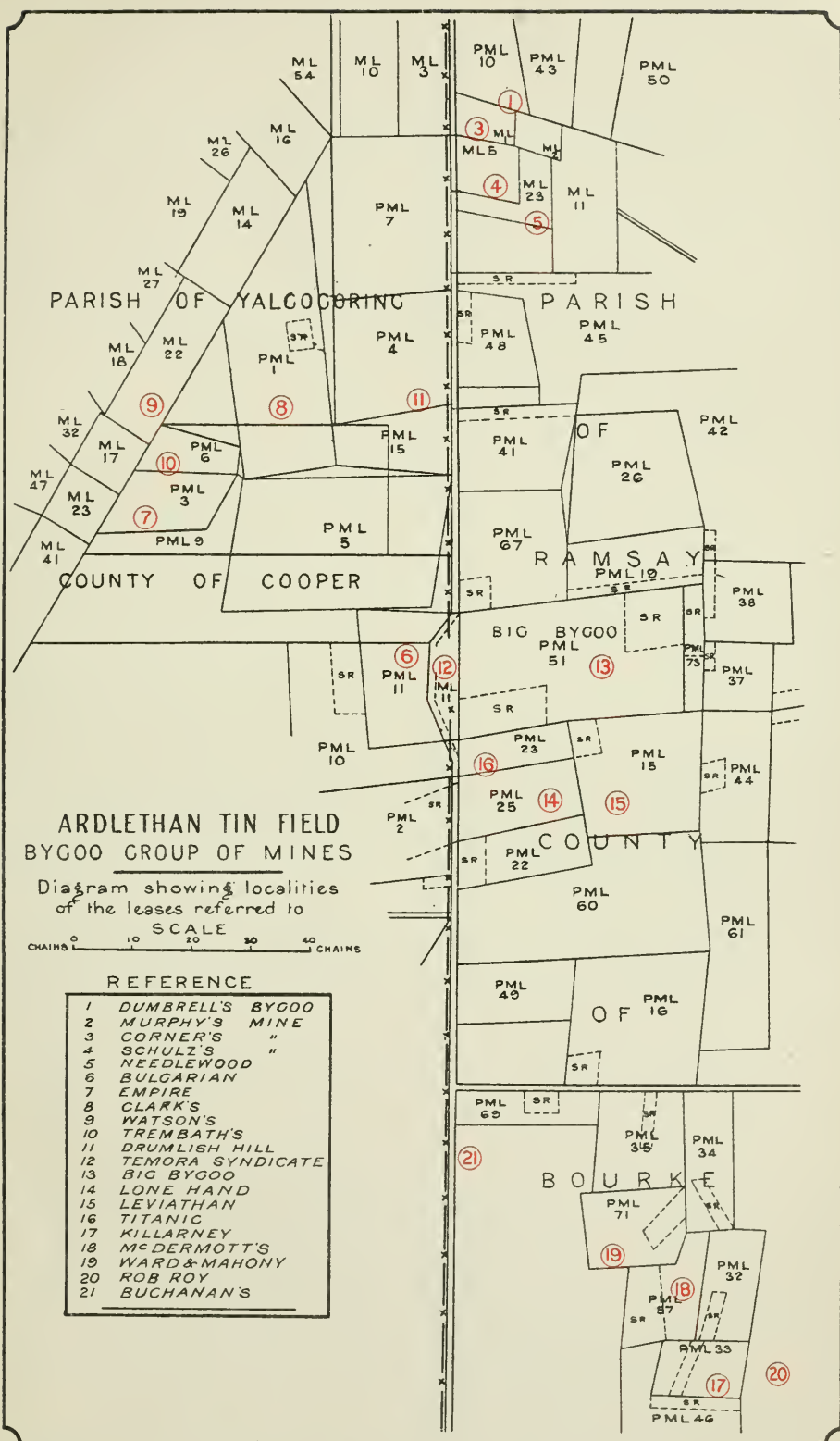
Some phenomenally rich tin has been obtained from here in the form of slugs or "spuds" (which is the local term for large masses of tinstone found in the loam), especially in No. 10 trench or open-cut, where 2½ tons of 63 per cent. ore were mined. A considerable amount of work has been done by means of shallow trenches and shafts. Only those were sampled which were reported to be payable by the owner. In all the others the tinstone had either cut out or had not been payable.

The Ardlethan Options Company held an option over this mine, but after testing several places, abandoned it. Of eight samples, only two gave payable assays, *i.e.*, Nos. 104 and 105 in No. 4 shaft at a depth of about 20 feet. The tin occurs here in quartz-tourmaline rock and greisen, formed by the alteration of granite in the neighbourhood of heads and joints as shown in the sketch.

It does not seem to continue for any length, and its permanency in depth is doubtful.

A new trench near No. 6 trench has recently yielded a pocket of payable tinstone which has cut out. It is interesting from the fact that the ore here is associated with tourmaline and topaz—an association of minerals noticeable in other parts of the field.

It is possible that other small pockets of ore will be found, but I do not think that any large tonnage of ore will be obtained from here.



PARISH OF YALGOO PARISH OF RAMSAY

COUNTY OF COOPER

COUNTY OF COOPER

**ARBLETHAN TIN FIELD
BYGOOL GROUP OF MINES**

Diagram showing localities
of the leases referred to

SCALE

CHAINS 0 10 20 30 40 CHAINS

REFERENCE

| | |
|----|-------------------|
| 1 | DUMBRELL'S BYGOOL |
| 2 | MURPHY'S MINE |
| 3 | CORNER'S " |
| 4 | SCHULL'S " |
| 5 | NEEDLEWOOD " |
| 6 | BULGARIAN |
| 7 | EMPIRE |
| 8 | CLARK'S |
| 9 | WATSON'S |
| 10 | TREMBATH'S |
| 11 | DRUMLISH HILL |
| 12 | TEMORA SYNDICATE |
| 13 | BIG BYGOOL |
| 14 | LONE HAND |
| 15 | LEVIATHAN |
| 16 | TITANIC |
| 17 | KILLARNEY |
| 18 | MCDERMOTT'S |
| 19 | WARD & MAHONY |
| 20 | ROB ROY |
| 21 | BUCHANAN'S |

Assuming that Mr. Dumbrell's estimates of values are correct (and they are probably high), the following approximate tonnage of payable ore at grass and *in situ* would be available:—

| | | | | | |
|-------------------|------------|-------------------|-----|-----------------------------|-------------------------------|
| At No. 2 shaft... | 50 tons... | ... | ... | Estimated at $2\frac{1}{2}$ | per cent. tin. |
| At No. 4 shaft... | 15 " | at grass | ... | " | $2\frac{1}{2}$ " " |
| At No. 4 shaft... | 20 " | (say) in shaft... | ... | " | 3 " " |
| At No. 10 trench | 30 " | ... | ... | " | 4 " " |
| At No. 7 shaft... | 10 " | ... | ... | " | $2\frac{1}{2}$ " " |
| Total | ... | 125 tons... | ... | ... | Estimated at 3 per cent. tin. |

Corner's Lease.

M.L., 1, Parish of Ramsay, County Bourke. 6 acres 2 roods 23 perches.
Samples, 110-115. (See drawing No. 1.)

On the southern boundary of Dumbrell's, and on the travelling stock route. The workings consist of two shafts and three trenches. The Ardlathan Options Company held an option over this mine, following down a rich pipe of tin ore in No. 1 shaft to a depth of about 60 feet, where they lost it. They also sank the No. 2 shaft to a depth of 40 feet and drove south-south-east at the bottom on a joint. A patch of good tin was found, but evidently did not continue down, and the option was abandoned.

No. 1 shaft at the time of my examination was 78 feet deep. The owners picked up the trail of the tin where the option holders had left it, followed it round in a spiral, and finally came on to the main pipe immediately under its original position, where it proved to be as rich as ever. This pipe is about 4 feet long by 2 ft. 6 in. wide, and is extraordinarily rich, occurring in kaolin surrounded by barren granite and intersected by heads and joints.

My samples (110-111—see sketch) gave assays of 29-31 per cent. and 37-30 per cent. tin, and ore up to 63 per cent. tin has been mined. Below the 60-foot level all the ore has been taken out. Above the 60-foot level ore estimated at 3 per cent. has been left for 12 feet on one end of the shaft and for 3 feet on the other end.

The continuation of the pipe downwards is purely speculative and will probably be determined by the joints on which it has been formed, and no safe estimate of tonnage can be made. The amount is not likely to be large, but will be very rich.

No. 2 shaft was sunk to cut a pipe of tin ore showing on the surface. This is an irregular body of quartz-tourmaline rock and greisen in barren granite, and has no definite form, ramifying into the barren rock and dying out near the bottom—one sample (113) assayed 3.1 per cent. tin, while another on the opposite end of the shaft (114) only yielded a trace. The amount of ore to be obtained from here is probably negligible.

No. 1 trench was full of water and could not be sampled.

No. 2 trench on the same body of stone assayed 0.93 per cent. tin.

The payable ore from this mine is practically confined to No. 1 shaft.

Taking the owner's estimate of payable ore left in the ends of this shaft, the quantity is:—

| | | | | | |
|--|-----|-----|---------------------|-----|--------------------|
| In ends of No. 1 shaft | ... | ... | 160 tons of | ... | 3 per cent. tin |
| Continuation of pipe for (say) 50 feet | | | 40 tons of (say) 20 | „ | „ |
| Total | ... | ... | 200 tons of | ... | 6·6 per cent. tin. |

Murphy's Mine.

M.L. 2 (adjoining M.L. 1 on the east), Parish of Ramsay, County of Bourke. 5 acres. Samples, 122-129. (See drawing No. 1.)

Four shafts have been sunk on this lease—Nos. 1, 2, and 3, close to the north-west corner, and No. 4, at the south-west corner of the lease, the latter being connected to Corner's No. 1 shaft.

Nos. 1, 2, and 3 shafts are sunk on bodies of quartz-tourmaline rock, greisen, and kaolinized granite; No. 4 was in barren granite, except near the bottom, at a depth of 62 feet, where a very small lens of quartz-tourmaline rock was found.

The samples taken from these workings only yielded traces of tin, and so far the property has proved to be valueless.

Schulz's Mine.

M.L. 5, Parish Ramsay, County Bourke, adjoining M.L. 1 on the south. Samples, 116-121. (See drawing No. 1.)

The workings consist of four shafts and one long trench. No. 1 shaft was sunk vertically for 14 feet on an irregular body of quartz-tourmaline rock, greisen, and kaolinized granite, with seams of ironstone gossan. Only one of the samples taken from near the bottom of the shaft (117—see sketch) was payable, assaying 2·25 per cent. tin, and this was running away flat in a south-west direction in the form of a pipe, and is probably the same pipe as that worked in No. 2 shaft.

No. 2 shaft was sunk vertically for 20 feet on a pipe of tin ore, which then pitched south for 15 feet at an angle of 26 degrees 20 minutes, then curved round west for 30 feet with a dip of 19 degrees, and became too awkward to mine from here. So, to get over the difficulty, No. 3 shaft was sunk to cut its continuation, but the owners failed to locate any payable ore.

No. 4 shaft is barren. No tonnage of payable ore can be estimated from this lease.

The Needlewood Mine.

M.L. 7, Parish Ramsay, County Bourke, adjoining M.L. 5 on the east. 25 acres. Samples 130-136. (See drawing No. 1.)

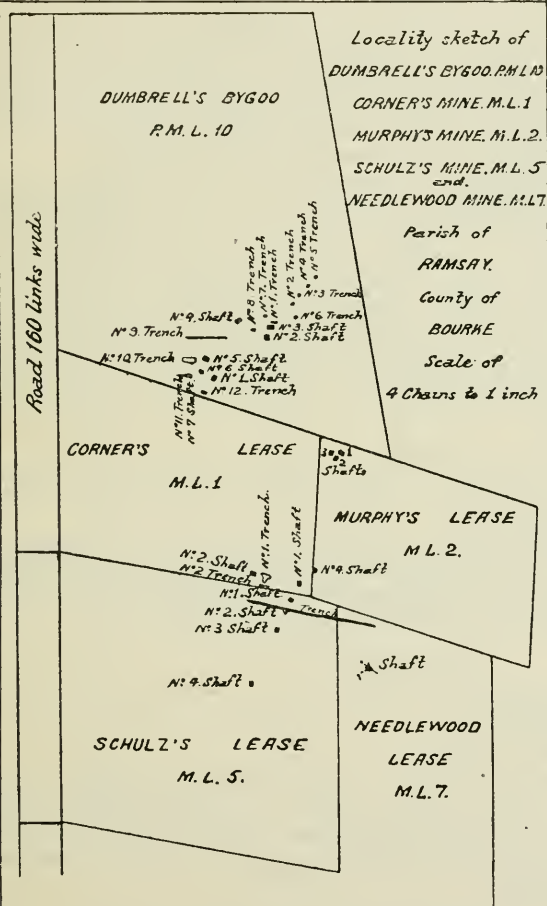
This lease was originally held by the Ardlethan Options Company, who sunk a shaft to a depth of about 28 feet and drove in various directions, as shown in the sketch. They subsequently abandoned the lease, which has recently been taken up by Schulz.

The whole of these workings are in decomposed granite, of which some is red and very gritty, and some white and almost entirely consisting of kaolin. It appears to be a basin where complete decomposition has taken place. The granite is full of seams of ironstone and tourmaline, and probably the tin is associated principally with these seams.

DUMBRELL'S BYGEO. P.M.L. 10; CORNER'S LEASE. M.L. 1.
 MURPHY'S LEASE. M.L. 2; SCHULZ'S LEASE. M.L. 5.
 and NEEDLEWOOD LEASE. M.L. 7.
 Parish of RAMSAY. County of BOURKE

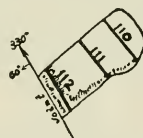
①

| Number of Sample | Locality. | Astay of TIN per-cent. |
|------------------|-------------------------------|------------------------|
| 102 | DUMBRELL'S MINE N° 2 Shaft | 0.28 |
| 103 | N° 6 Trench | Trace |
| 104 | N° 9 Shaft | 2.80 |
| 105 | " | 3.44 |
| 106 | " | " |
| 107 | " | 0.89 |
| 108 | N° 7 Trench | 1.51 |
| 109 | N° 12 " | 1.73 |
| 110 | CORNER'S MINE N° 1 Shaft | 29.31 |
| 111 | " | 37.30 |
| 112 | " | 1.53 |
| 113 | N° 2 Shaft | 3.10 |
| 114 | " | Trace |
| 115 | N° 2 Trench | 0.93 |
| 116 | SCHULZ'S MINE N° 1 Shaft | 0.35 |
| 117 | " | 2.25 |
| 118 | " | Trace |
| 119 | " | " |
| 120 | " | 0.84 |
| 121 | N° 2 Shaft | 0.54 |
| 122 | MURPHY'S MINE N° 2 Shaft | Trace |
| 123 | N° 1 Shaft | " |
| 124 | " | " |
| 125 | " | " |
| 126 | " | " |
| 127 | N° 4 Shaft | " |
| 128 | N° 3 Shaft | " |
| 129 | " | " |
| 130 | NEEDLEWOOD SW Drive | 0.83 |
| 131 | " | 1.16 |
| 132 | " | 0.31 |
| 133 | " | Trace |
| 134 | N Drive | 0.23 |
| 135 | S.E. Drive | 0.15 |
| 136 | N.W. Drive | Trace. |

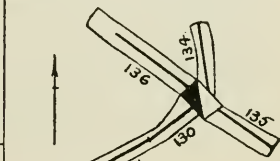


Quartz-Tourmaline.
 Granite.
 Gneiss.

CORNER'S M.L. 1



Plan at bottom of N° 1 Shaft.
 Scale of 10 feet to 1 inch



NEEDLEWOOD. M. L. 7.
 Plan of Drives at 28' Level.
 Scale of 20 feet to 1 inch

DUMBRELL'S P.M.L. 10.

NE end. SW end.



Plan and sections of N° 4 Shaft
 Scale of 10 feet to 1 inch

SCHULZ'S M.L. 5



Plan of bottom of N° 1 Shaft
 Scale of 5 feet to 1 inch.

The best sample obtained (No. 131—see sketch) showed a value of only 1.16 per cent., but as the ground is very soft and can be cheaply mined it may be regarded as payable ore. None of the other samples exceeded 0.83 per cent. I estimate the possible quantity of payable ore from this mine as 200 tons of 1.16 per cent.

Drumlish Hill Mine.

P.M.L. 4, Parish Yalgogoring, County Cooper. 41 acres 3 roods. Not sampled. (See drawing No. 2.)

This lease is about half a mile south from Dumbrell's, and is owned by a company. A number of shafts and trenches have been opened on two belts of quartz-tourmaline rock and greisen, besides some outside isolated workings. The general trend of these belts is about west-south-west, and they show the usual characteristic alteration of the original granite into the greisenized and tourmalinized rock in the neighbourhood of joints.

Some of the shafts are fairly deep, being sunk to over 90 feet, but very little payable tin has been obtained. A parcel of 40 tons was raised from Nos. 1 and 4 shafts, and yielded 5½ per cent. tin at the Southern Cross battery; 27 tons came from No. 1 shaft, about 14 feet deep in quartz-tourmaline rock, carrying about 2 per cent. tin, and 13 tons from a pipe in No. 4 shaft, which is 20 feet deep. The tin occurs here in a small seam of massive mica in greisen and is fairly rich, averaging about 12½ per cent. tin, and a good ore is still being won. This is the only parcel that has been treated from the mine, and the developments to date are not promising. No tonnage of payable ore can be depended upon.

Clark's Mine.

P.M.L. 1, Parish Yalgogoring, County Cooper. 63 acres 2 roods 20 perches. Samples, 99-101.

Situated immediately west of Drumlish Hill lease. The workings consist of two shafts and several trenches inside the Surface Rights block. Tin has been obtained in both shafts in lenticular bodies of greisen. The quantity of this stone is limited and the samples obtained are unpayable.

Watson's Mine.

M.L. 22, Parish Yalgogoring, County Cooper. 24 acres 3 roods 14 perches. Not sampled.

Situated west of Clark's P.M.L. 1.

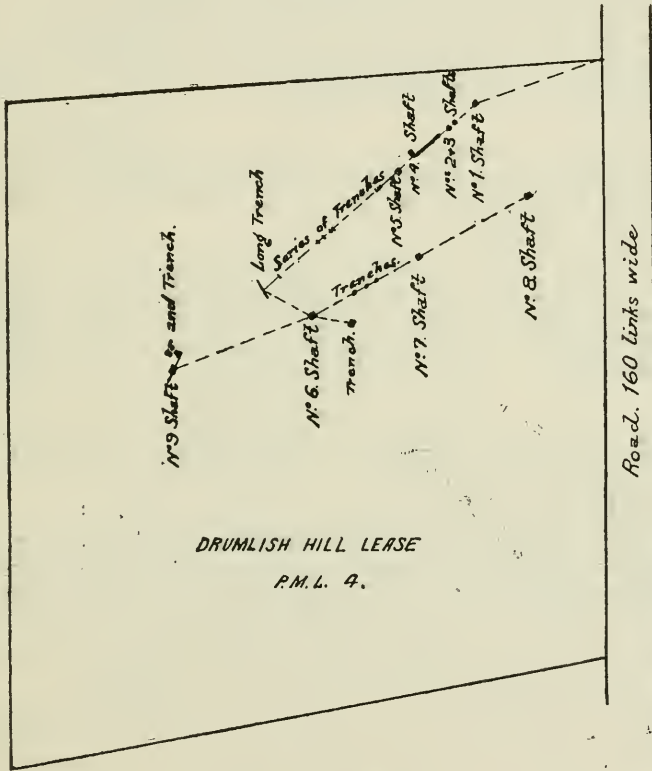
This mine was held by the Ardlethan Options Company, who sank two shafts and cut several trenches on two bodies of quartz-tourmaline. The deepest shaft is about 40 feet, but at the bottom the quartz-tourmaline cut out in the unaltered granite. As there was no quantity of stone here the mine was not worth sampling.

Trembath's Mine.

P.M.L. 6, Parish Yalgogoring, County Cooper. 10 acres 1 rood 2 perches. Not sampled.

This lease adjoins the south-east corner of M.L. 22. Three shafts have been sunk on a quartz-tourmaline reef, running from the north-west corner of the lease into the Empire lease, where it has also been opened. No payable stone appears to have been found. A shaft was also sunk at the south-east corner of the lease to test a run of alluvial tin, but the results were disappointing and work was finally abandoned altogether on the mine.

(2)



DRUMLISH HILL LEASE
P.M.L. 4.

Locality Plan of
DRUMLISH HILL MINE. P.M.L. 4.
Parish of YALGOGORING. County of COOPER.
Scale of 4 Chains to 1 inch.

The Empire Mine.

P.M.L. 3, Parish of Yalgogoring, County Cooper. 18 acres 3 roods 8 perches. Samples, 78-98. (See drawing No. 3.)

This lease adjoins P.M.L. 6 on the south, and a good deal of work has been done just over the southern boundary of the latter claim.

At this point a network of quartz-tourmaline veins has been opened, running into and crossing one another. These have been prospected by means of two shafts and six main trenches. The quartz here is so heavily charged with tourmaline as to colour the rock almost black. The main reef, which strikes about north-north-east and dips west 75 degrees, has been proved by means of Nos. 1 and 2 shafts about 120 feet apart. The longitudinal section and sketch of No. 2 shaft (see drawing) shows clearly how the reef cuts out in the granite and the probable pitch north-east, and limit of depth under No. 1 shaft.

The only payable samples of ore obtained were in the north end of No. 1 shaft (samples 83-86—see sketch), where a body of stone about 15 feet long, 3 feet wide, and perhaps 80 feet deep, or, say, 300 tons of about 3 per cent. tin should be obtainable.

No. 2 trench, which is L-shaped, has been opened on two reefs, one of which is identical with that in the shafts, the other being a continuation of the reef in Trembath's lease. Neither these nor the other samples in the mine were payable. Total tonnage of payable ore estimated in the mine and surface heaps, say, 400 tons of 3 per cent. tin.

Slattery's Bulgarian Mine.

P.M.L. 11, Parish Yalgogoring, County Cooper. 27 acres 0 roods 36 perches. Samples, 70-77.

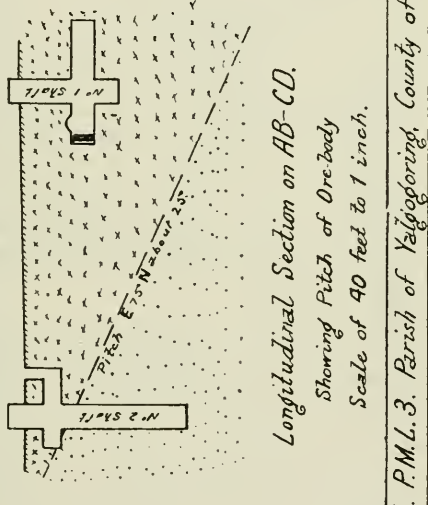
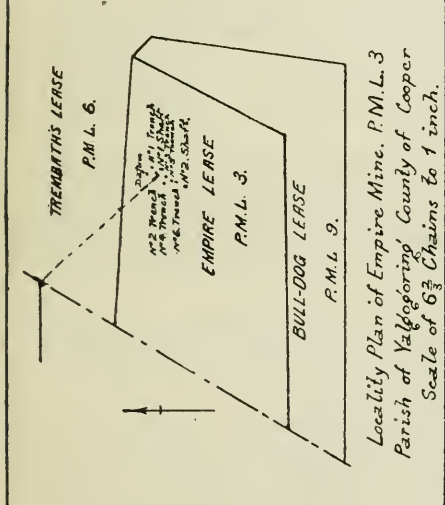
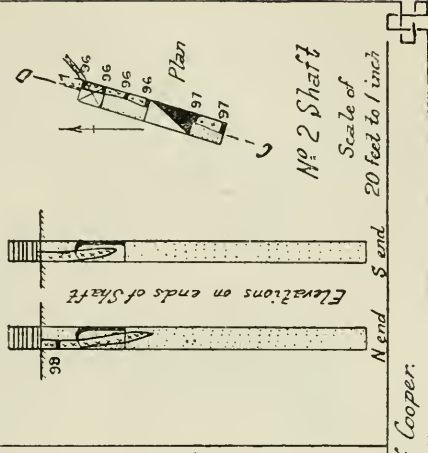
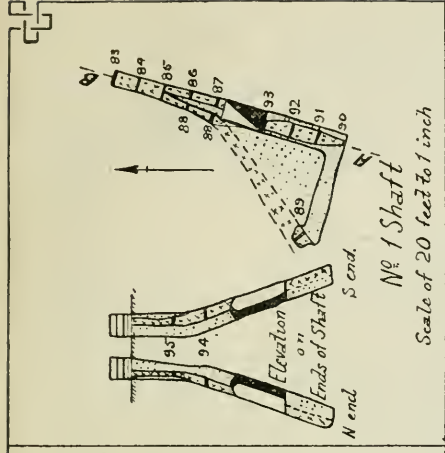
Two shafts and several trenches have been put down on bodies of quartz-tourmaline rock and greisen in the north-east corner of the lease, and some good ore was obtained, but in every case this body of stone cut out at shallow depths ranging from 10 to 20 feet, and at the time of my visit no payable ore was obtainable, and none of the samples gave payable results.

Farther south, seven small parallel quartz-tourmaline veins had been exposed in two trenches, but they were evidently unpayable.

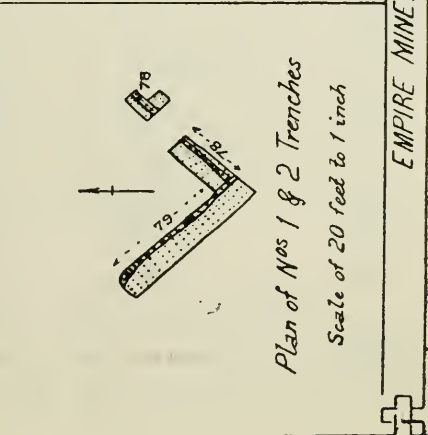
The owner gave the following estimate of ore lying at the surface.

| | | |
|-------------------------|----------|--|
| Heaps at No. 1 shaft... | 15 tons | firsts, estimated at 10 per cent. tin. |
| | 1 ton | finer, " 10 " " |
| | 1 ton | mixed, " 10 " " |
| At No. 2 shaft ... | 16 tons, | estimated at (say) 3 " " |
| From No. 1 trench ... | 4 tons, | " (say) 4 " " |
| From No. 2 trench ... | 7 tons, | " 10 " " |
| | 4 tons, | " 10 " " |
| | — | — |
| Total ... | 48 tons | ... 7 per cent. tin. |

But, during my stay at Ardlethan, these heaps were picked over and the selected ore sent to the Southern Cross battery, where 13½ tons were treated, yielding about 2 per cent. tin, which is a good illustration of the unintentional exaggeration sometimes indulged in.



| Number of Sample | Empire Mine Locality | Assay of Tin percent |
|------------------|----------------------|----------------------|
| 78 | N 2 Shaft | Trace |
| 79 | N 2 Shaft | Trace |
| 80 | N 2 Shaft | Trace |
| 81 | N 2 Shaft | Trace |
| 82 | N 2 Shaft | Trace |
| 83 | N 2 Shaft | Trace |
| 84 | N 2 Shaft | Trace |
| 85 | N 2 Shaft | Trace |
| 86 | N 2 Shaft | Trace |
| 87 | N 2 Shaft | Trace |
| 88 | N 2 Shaft | Trace |
| 89 | N 2 Shaft | Trace |
| 90 | N 2 Shaft | Trace |
| 91 | N 2 Shaft | Trace |
| 92 | N 2 Shaft | Trace |
| 93 | N 2 Shaft | Trace |
| 94 | N 2 Shaft | Trace |
| 95 | N 2 Shaft | Trace |
| 96 | N 2 Shaft | Trace |
| 97 | N 2 Shaft | Trace |
| 98 | N 2 Shaft | Trace |



3

Granite... Ore...

Plan of Nos 1 & 2 Trenches
Scale of 20 feet to 1 inch

EMPIRE MINE. P.M.L. 3. Parish of Yalgogoring, County of Cooper.

Temora Syndicate.

M.L. 11, Parish Yalgogoring, County Cooper. 8 acres 3 roods 30 perches. Samples, 1-8. (See drawing No. 4.)

This mine is on the western end of a massive body of quartz-tourmaline rock striking east and west, and a continuation of the western workings of the Big Bygoo Mine. Four trenches have been opened across the outcrop, and samples were taken where the stone was said to carry good tin, but all of them proved to be unpayable.

Work on this mine was subsequently abandoned.

Big Bygoo Syndicate.

P.M.L. 51, Parish Ramsay, County Bourke. 80 acres. Samples, 9-20. (See drawing No. 4.)

Ore has been mined in two separate parts of this lease. One set of workings on their Surface Rights block, in the south-west corner of the lease, and one in the Surface Rights block in the north-east corner. All the work in the south-west corner has been confined to a big outcrop of quartz-tourmaline rock striking east and west, in a hill of pink tourmaline-biotite-granite. This body of stone has a prominent and well-defined outcrop, but Nos. 1 and 2 shafts have proved it to be an irregular mass ramifying into the granite and apparently terminating against it in an uneven manner, and it is probable that this stone will disappear entirely at no great depth, as the Empire reef did on a smaller scale.

The owners informed me that they believed that the whole outcrop would average 2 per cent. tin, but my samples, most of which were taken only where good tin values were said to exist, did not substantiate this. In fact, only three samples (Nos. 18-20) gave payable results, and these were from pockets and pipes adjacent to well-defined heads, which had favoured the deposition of tin.

The Ardlethan Options sank No. 2 shaft to a depth of 50 feet, and drove into the stone as shown in the sketch, but got no values over 0.5 per cent. tin. No. 1 shaft, which is 25 feet deep, was said to carry good tin, but none of the samples exceeded 0.2 per cent. tin.

Sample 20 from No. 3 shaft was taken on a known pipe of good ore; the rest of the shaft was poor. Nos. 18 and 19 samples were taken in No. 4 trench or cut, where rich tin was faced on the joints in the rock and did not continue down. At the north-east corner of the lease some good ore was obtained from a pipe which went down vertically, then ran round horizontally in a semicircle and cut out—other patches have been found in chlorite and quartz-tourmaline rock, and as there is a big body of quartz-tourmaline in this corner it is likely that other pockets will be found, but my tests point to the probability that they will be very limited in extent.

Altogether, in twelve months, about 172 tons of 6 $\frac{3}{4}$ per cent. ore has been sent away—not a very promising result from so large a deposit. 200 tons of payable ore may be obtainable from here.

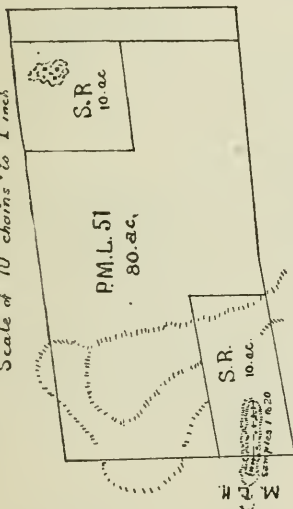
Titanic Mine.

P.M.L. 23, Parish Ramsay, County Cooper. 12 acres 1 rood 27 perches. Samples, 56-62. (See drawings Nos. 5 and 6.)

Situated immediately south of the south-west Surface Rights block of Big Bygoo. Consists of a shaft which has been sunk to a depth of 27 ft. 6 in. from the surface on a quartz-tourmaline reef, striking east and west, and dipping S. 62 degrees in granite. Its average width is about 12 inches,

| Sample | Number | Assay value per cent | Assay value per cent |
|--------|--------|----------------------|----------------------|
| 1 | 0.52 | 0.05 | 0.10 |
| 2 | 0.10 | 0.00 | 0.00 |
| 3 | 0.00 | 0.67 | 0.72 |
| 4 | 0.72 | 0.39 | 0.10 |
| 5 | 0.10 | 0.05 | 0.10 |
| 6 | 0.05 | 0.20 | 0.10 |
| 7 | 0.19 | 0.04 | 0.10 |
| 8 | 0.04 | 1.11 | 0.07 |
| 9 | 1.11 | 0.84 | 0.64 |
| 10 | 0.84 | 0.64 | 0.64 |
| 20 | 0.64 | 0.64 | 0.64 |

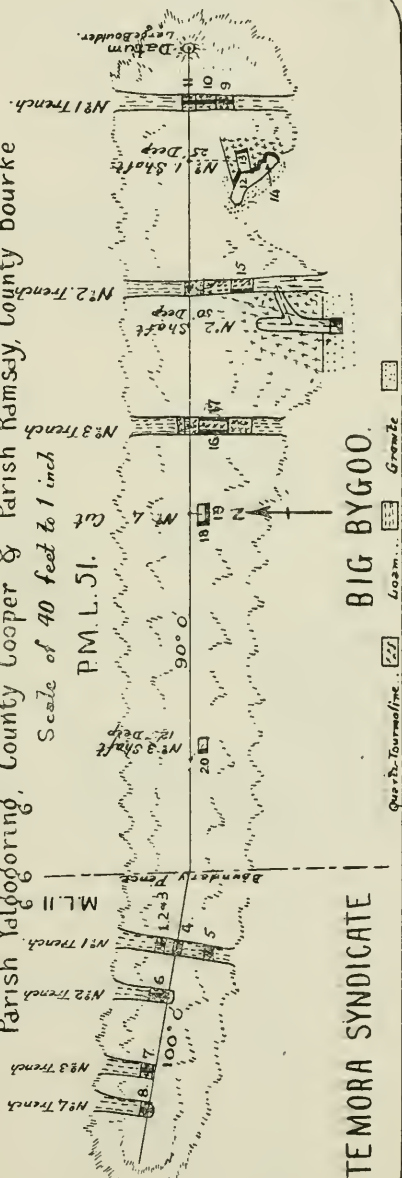
Locality Plan
Scale of 10 chains = 2 1/2 inch



| Number of Tins | Description | Per cent | Assay of Tin % |
|----------------|---------------|----------|----------------|
| 10 | Firste | 6% | 6.7% |
| 60 | Scamnds | 3% | |
| 45 | Thrses | 8% | |
| 30 | " | 10% | |
| 3 | " | 15% | |
| 2 | " | 11% | |
| 12 | Sent lately | 10% | |
| 10 | " | 7% | |
| 172 | Total average | 6.7% | |

TEMORA SYNDICATE (M.L.11) & BIG BYG00 (P.M.L. 51) MINES
Parish Yalgogoring, County Cooper & Parish Ramsay, County Bourke

Scale of 40 feet to 1 inch



TEMORA SYNDICATE

BIG BYG00.

Que. 25. - Bourke Mine. 251
Loam... Growth

but it varies considerably, and in places passes into greisen, and in other parts merges into granite, thus maintaining the characteristic evidence of alteration of the granite in the neighbourhood of main joints. This shaft was closely sampled, and the best result obtained was only 1·8 per cent. tin which is not payable. The ore contains appreciable quantities of wolfram. Another irregular body has been opened about 400 feet further east, but no payable results were obtained.

Before leaving the field I revisited this mine, and found that the owners had abandoned the work there.

Coote's Lone Hand Mine.

P.M.L. 25, Parish of Ramsay, County Bourke. 21 acres 2 roods 4 perches. Samples, 21-55 and 261. (See drawing No. 5.)

This mine adjoins the Titanic on the south, and is not only one of the most important and promising mines in the Byggo group, but one of the best so far discovered on the field outside the payable ones of the Carpathia group.

The Ardlethan Options held an option over this property and did a considerable amount of work on it, but seem to have confined their attention to the least valuable part of the lease. Three shafts and seven trenches have been put down on various parts of the lease.

No. 2 shaft is sunk to a depth of about 50 feet on a large outcrop of quartz-tourmaline rock, which shows on the surface for some 100 feet, striking approximately east and west, dipping S. 75 degrees.

No. 2 shaft and Nos. 1 to 4 trenches are sunk on a similar outcrop about 200 feet farther south, with approximately the same strike and dip.

No. 5 trench is on a north and south outcrop of quartz-tourmaline rock, junctioning with the previously mentioned outcrop at No. 4 trench.

Nos. 6 and 7 trenches and No. 3 shaft are on bodies of quartz-tourmaline rock and greisen, which may or may not be a continuation of the ore body on which No. 1 shaft has been sunk. No. 2 shaft has been driven 15 feet east at the 50-foot level; the shaft itself followed a main joint or head in the quartz-tourmaline, striking 75 degrees and dipping about south 80 degrees; this joint continued down the middle of the shaft, with granite as a hanging wall. The drive was put in with the joint as a south wall; the total width of stone would average about 8 feet.

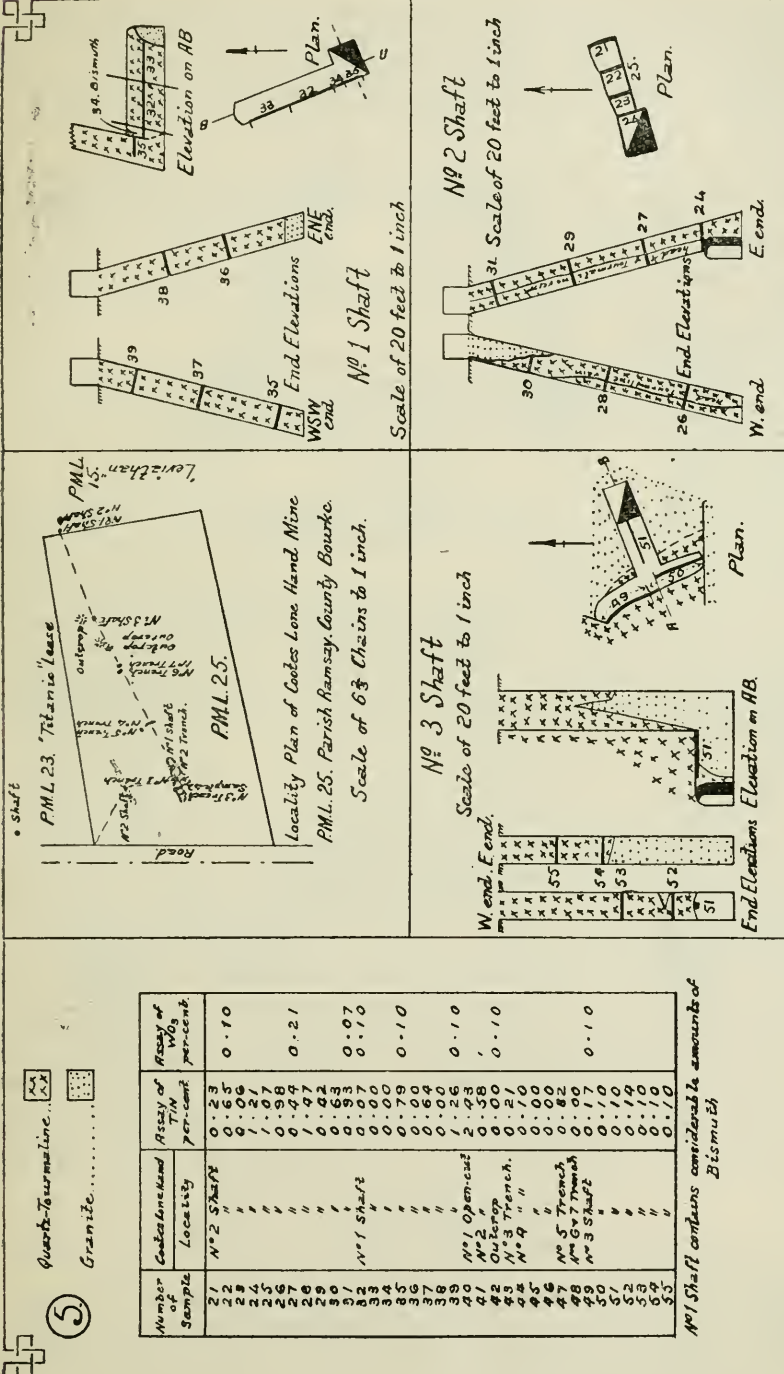
Mr. Coote subsequently drove about 30 feet west on the same joint at the 50-foot level, and obtained payable stone. The joint is very persistent and no doubt accounts for the tin values in this shaft.

The analysis of the samples taken from here (Nos. 21 to 31—see sketch) did not yield high values, but proved the tin to be uniformly distributed throughout the stone. About 150 tons sent from here for treatment averaged $3\frac{1}{2}$ per cent. tin.

About 100 tons remained in the dump, and a representative sample (261) reduced from half a ton, taken uniformly from different parts of this heap, assayed 1·35 per cent. tin.

With the enriched portions of ore likely to be found in developing this body, it is probable that a considerable quantity of payable ore will be obtained from here.

No. 1 shaft is also about 50 feet deep, and has been cross-cut in a northerly direction for about 20 feet. The granite was kept as a hanging wall, but the stone extends back into the footwall for a considerable distance, as proved by the cross-cut.



| Number of Sample | Collected at Locality | Assay of TIN per-cent | Assay of Wg. percent |
|------------------|-----------------------|-----------------------|----------------------|
| 21 | No. 2 Shaft | 0.23 | 0.10 |
| 22 | " | 0.25 | " |
| 23 | " | 0.06 | " |
| 24 | " | 1.27 | " |
| 25 | " | 0.58 | " |
| 26 | " | 1.47 | " |
| 29 | " | 0.42 | 0.21 |
| 30 | " | 0.63 | " |
| 31 | " | 0.93 | 0.07 |
| 32 | No. 1 Shaft | 0.07 | 0.10 |
| 33 | " | 0.00 | " |
| 34 | " | 0.00 | " |
| 35 | " | 0.79 | 0.10 |
| 36 | " | 0.00 | " |
| 37 | " | 0.00 | " |
| 38 | " | 0.00 | " |
| 40 | No. 1 Open-cut | 2.23 | 0.10 |
| 41 | No. 2 " | 0.58 | " |
| 42 | Outcrop | 0.21 | " |
| 43 | No. 3 Trench | 0.10 | 0.10 |
| 44 | No. 4 " | 0.00 | " |
| 46 | " | 0.00 | " |
| 47 | No. 5 Trench | 0.02 | " |
| 48 | No. 6 Trench | 0.00 | " |
| 49 | No. 3 Shaft | 0.17 | 0.10 |
| 50 | " | 0.10 | " |
| 52 | " | 0.10 | " |
| 53 | " | 0.10 | " |
| 54 | " | 0.10 | " |
| 55 | " | 0.10 | " |

No. 1 Shaft contains considerable amounts of Bismuth

Coates "Lone Hand" Mine. P.M.L. 25 Parish of Ramsey, County of Bourke. Showing shaft details, also position of shafts on "Titanic Lease. P.M.L. 23, and the Leviathan Lease. P.M.L. 15.

At the bottom of the shaft in the east-north-east end granite is showing. It rolls under foot in the middle of the shaft, and quartz-tourmaline rock shows in the west-south-west end. No driving has been done here. No. 1 trench, which is 39 feet west from the shaft, showed good values (2.43 per cent.) on the surface, and it is therefore possible that by driving west other patches of ore may be found.

The samples, however, from this shaft were very disappointing, none of them showing payable values. In addition, the ore carries a great deal of bismuth; in fact, sample 34 (see sketch) was practically all bismuth-oxide in the matrix, assaying 15 per cent. Bi.

In all the other trenches along this line considerable bodies of quartz-tourmaline rock and greisen have been exposed, but none of the samples gave payable results.

No. 3 shaft has been sunk vertically for a depth of 44 feet on an irregular body of quartz-tourmaline rock, and greisen, and was driven and cross-cut as shown in the sketch. I was informed that good values up to 3 per cent. tin would be obtained down to 30 feet, but none of my samples gave results over 0.17 per cent.

The occurrence of the stone in this shaft is very erratic and irregular, the sketch showing the peculiar way in which it ramifies into the granite; the stone also is barren looking, and it is improbable that payable ore will be got from here in any quantity.

In my opinion, the quartz-tourmaline rock will sooner or later cut out in depth. Nevertheless, having regard to the length and width of the outcrop, it seems probable that the ore body will continue downwards for some distance, especially in No. 2 shaft.

While it is impossible to estimate tonnages with any certainty, this mine may yield a large quantity, perhaps amounting to 1,500 tons, of 3 per cent. tin.

The Leviathan Mine.

P.M.L. 15, Parish Ramsay, County Bourke. 43 acres 1 rood 6 perches.
Samples, 63-69. (See drawings 5 and 6.)

This lease adjoins the Lone Hand on the east. Two shafts have been sunk close together. No. 1 shaft was driven as shown at the 18-foot level, following round an isolated body of quartz-tourmaline rock and greisen, which did not show at the surface, and is very limited in extent.

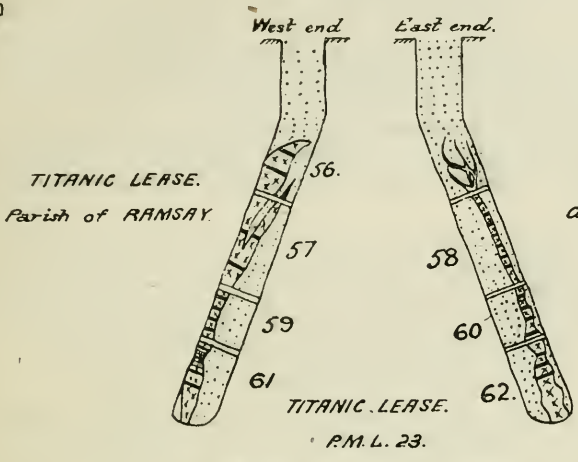
No. 2 shaft is sunk vertically for 56 feet, intersecting a small body of greisen near the bottom. This was followed in a northerly direction, pitching downwards at about 21 degrees, and passed into decomposed kaolinized granite and kaolin full of tourmaline. A drive was also put in about 28 feet south-west all in granite except at the end, where a bunch of quartz was met with, resembling a floater in the granite. This is immediately under the end of the drive in No. 1 shaft. The probable shape and extent of this stone is shown in drawing No. 6. None of the samples gave payable results.

The Vulcan Mine.

P.M.L. 16, Parish Ramsay, County Bourke. 49 acres 2 roods 28 perches.
Not sampled.

This lease is abandoned as no payable ore was discovered on it. Several open-cuts and shafts have been sunk on outcrops of quartz-tourmaline rock, greisen, and altered granite in the neighbourhood of joints, but evidently without favourable results.

6



TITANIC LEASE.
Parish of RAMSAY.

P.M.L. 23.
County of BOURKE.

| Number of Sample | Assay of TIN Per-cent |
|------------------|-----------------------|
| 56 | 0.53 |
| 57 | 0.27 |
| 58 | 0.76 |
| 59 | 1.80 |
| 60 | 0.89 |
| 61 | 0.28 |
| 62 | 0.10 |

Wolfram present

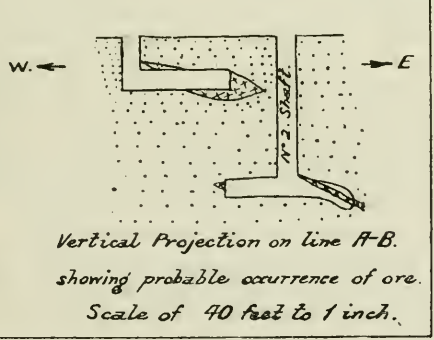
Elevations on ends of Shaft.
Scale of 10 feet to 1 inch

Granite

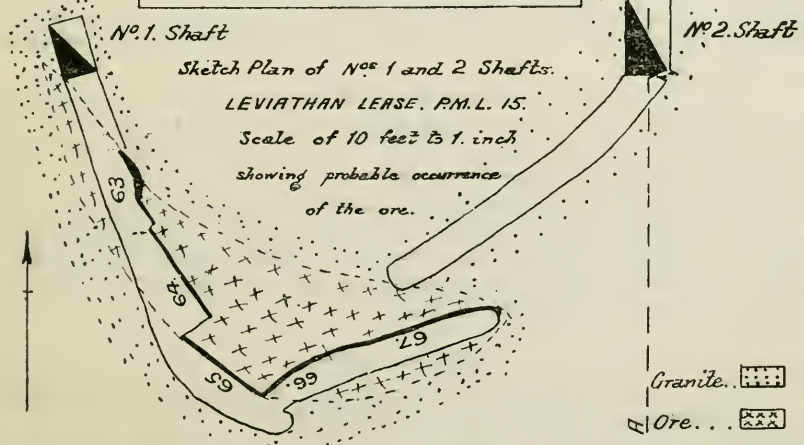
Quartz-Tourmaline

| Number of Sample | Assay of TIN Per-cent |
|------------------|-----------------------|
| 63 | 0.10 |
| 64 | 0.20 |
| 65 | 0.00 |
| 66 | 0.27 |
| 67 | 0.00 |
| 68 | 0.12 |
| 69 | 0.18 |

Wolfram present.



Vertical Projection on line A-B.
showing probable occurrence of ore.
Scale of 40 feet to 1 inch.



Sketch Plan of Nos 1 and 2 Shafts.
LEVIATHAN LEASE. P.M.L. 15.
Scale of 10 feet to 1 inch
showing probable occurrence
of the ore.

Granite
Ore

LEVIATHAN LEASE. P.M.L. 15. Parish of RAMSAY. County of BOURKE.

Buchanan's Mine.

Authority to Enter, Parish Ramsay, County Bourke. Samples, 137-144.

This mine is about one-third of a mile due west of P.M.L. 27 of the same parish and county, and has been prospected by five trenches or open-cuts and two shallow shafts. Only one man is working here.

Nearly all the places where the block has been prospected are in quartz-tourmaline rock and blue greisen, typical alteration products of the granite along joints and heads, many of them merging into granite both on the sides and underneath.

None of the samples gave payable assays, and so far no parcels of ore have been sent away. No. 4 cut is interesting as it contains molybdenite, bismuth, copper, tourmaline, and a little tin in quartz-tourmaline rock in red granite, but it does not go down, being cut off by a ledge of granite on which it is resting. No tonnage of ore can be counted upon from here.

Mahony and Ward's Mine.

P.M.L. 71, Parish Ramsay, County Bourke. 22 acres 0 roods 28 perches.

Samples, 145-153. (See drawing No. 7.)

This lease is one of a group situated from a mile to 2 miles south-south-easterly of the Lone Hand.

A quartz-tourmaline reef, striking about 210 degrees and dipping west from 45 degrees to 55 degrees, has been opened by means of trenches for a distance of about 300 feet. Inside the Surface Rights block the reef is well defined and continuous from No. 1 to No. 6 trench, a distance of about 120 feet. Beyond this an outcrop shows for about a chain, and two shallow shafts have been sunk in the extreme north-east corner of the block, where the reef becomes more micaceous and granitic.

The sample from No. 1 trench assayed 1.21 per cent. tin.

That from No. 2 trench assayed 2.45 per cent. tin.

That from No. 3 trench assayed 1.45 per cent. tin.

None of the other workings gave payable results. A shaft was subsequently sunk to a depth of about 20 feet on the reef in No. 2 trench to obtain a crushing, and at this depth the reef closed in and was replaced by granite. It is probable, therefore, that like the Empire, and other ore bodies of this character, the vein will cut out at a shallow depth, throughout the whole distance.

A crushing of 6 tons taken from No. 2 trench on 27th April yielded 5 cwt. of concentrates, assaying about 65 per cent. tin, giving an assay value of about 2.7 per cent. to the crude ore. It is possible that 200 tons of 2½ per cent. ore can be obtained from this reef.

Another reef of similar character, with a corresponding strike and dip, has been uncovered about 500 feet west of No. 1 shaft. Sample 153, taken from here, assayed 0.57 per cent. tin, but patches of better ore might be obtained if other trenches were opened on the same line. This reef will probably also cut out at a shallow depth.

McDermott's Mine.

P.M.L. 57, Parish Ramsay, County Bourke. 18 acres 3 roods 24 perches.

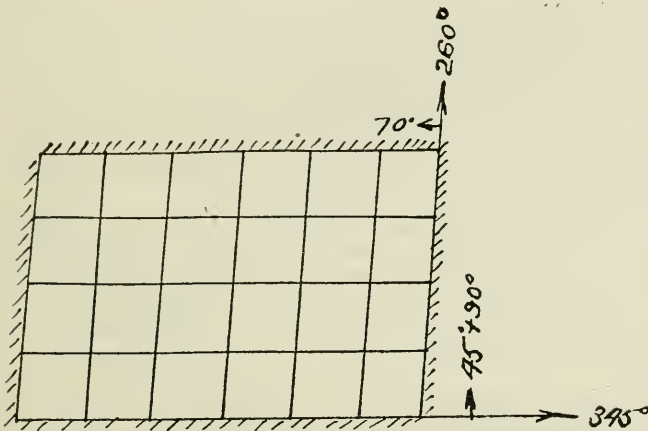
Samples, 160-164. (See drawing No. 7.)

This lease adjoins Ward and Mahony's on the south and lies immediately west of Cox's Killarney P.M.L. 32.

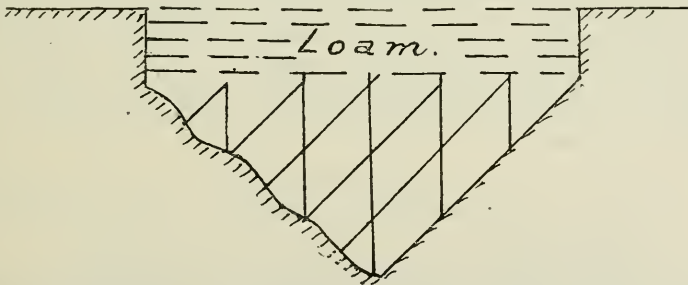
Four shallow trenches have been put down on different parts of the lease as shown. Four samples (Nos. 161-164) were taken where payable stone was said to occur, but these only yielded traces of tin, and so far the lease has proved valueless.

No. 1 open-cut is about 12 feet deep, sunk on a wide body of stone consisting of quartz-tourmaline rock and greisen, cut up into blocks by three series of joints, one series striking 345 degrees dipping west 45 degrees, one striking 345 degrees dipping vertically, and one striking 260 degrees, dipping south 70 degrees.

The appearance of the cut in plan would therefore be somewhat as shown—



The double set of joints striking 345 degrees, one of which is vertical and the other dips west 45 degrees, gives a series of blocks on the north or south ends of the cut of a lozenge or diamond shape, thus:—



The open-cut has been put down on one of the joints striking 345 degrees, and one of those striking 260 degrees, and therefore resembles an inverted pyramid. It seems evident that these joints have permitted the alteration of the granite into quartz-tourmaline rock and greisen in their vicinity, and this supposition is strengthened by the fact that in parts of the cut where the joints are absent the greisen merges into granite.

The owner informed me that payable tin ore was obtained near the surface, but bismuth replaced the tin, and the bottom contains bismuth only.

Nos. 2 and 3 trenches were sunk on a joint showing the typical altered rock in granite, but in both places they were superficial.

In No. 4 trench traces of tin are found in quartz-tourmaline rock and greisen formed on a joint in granite, but the ore is not likely to continue.

No tonnage of ore can be estimated from here.

Cox's Killarney Mine.

P.M.L. 32, Parish Ramsay, County Bourke. 18 acres 3 roods 22 perches. Samples, 165-168. (See drawing No. 7.)

This lease originally included another block (P.M.L. 33), but the latter has been abandoned. Mr. Cox also held a lease known as the Dalkeith, situated due north of P.M.L. 32, but has abandoned this also, and has confined his later prospecting entirely to P.M.L. 32.

Two shafts and several open-cuts have been put down on an outcrop of quartz-tourmaline rock and greisen, striking 35 degrees, dipping west about 60 degrees.

This outcrop is particularly interesting, from the fact that a large pale-blue boulder stands up prominently between the two shafts. It is very dense and heavy, and a specimen sent to Mr. Card, the Curator of the Geological Museum, was identified as topaz, proving its analogy to topazised granite found in Cornwall, England, and Mount Bischoff, Tasmania. It was from the blue colour of this rock that the mine got its name.

Topaz rock was afterwards recognised at Dumbrell's Bygoo, the Outcast, the Black and White, and the White Crystal.

No. 1 shaft is about 39 feet deep, sunk on a rubbly formation consisting of granite, quartz-tourmaline rock, and greisen, alternating more or less from one to the other. On the south end of the shaft this formation goes down to within 10 feet of the bottom, and is replaced by a large body of greisen, which, in its turn, rests on primary granite near the bottom. On the north end it goes down to within 5 feet of the bottom and cuts out on granite.

In the bottom a small lens of quartz-tourmaline has formed on a minor joint in the granite. It appears to be entirely isolated and local, and gave an assay result of 1.55 per cent. tin (sample 165). None of the other samples gave results exceeding 0.56 per cent. No. 2 shaft, 10 ft. 6 in. deep, was sunk on a joint which has caused lateral alteration for a few inches into quartz, merging into greisen, and then grey granite. It is of no value and was not sampled. No tonnage of ore can be estimated from this lease. The Dalkeith workings appear from inspection to have all been sunk on minor joints where greisenization has taken place, with masses of pure stellar mica on the joints carrying a little tin. It is evident that no payable ore was found here.

The Rob Roy Mine.

Abandoned. Parish Ramsay, County Bourke. Samples, 154-159. (See drawing No. 7.)

This block appears to have been held by Mr. Cox under an Authority to Enter. He sunk a shaft bearing 105 degrees, about 400 feet from the south-east corner peg of his lease P.M.L. 32.

The shaft is 32 feet deep and has been put down between two well-defined walls or joints about 3 ft. 6 in. apart, striking 5 degrees, dipping west 75 degrees, and driven at the bottom for 11 ft. 9 in. north and for 3 feet south. The formation between these two walls is a blue greisen. The unaltered granite in places penetrates and is intermixed with the "lode," and in other places occurs as bands in it. It appears to be an alteration of the granite on a large scale.

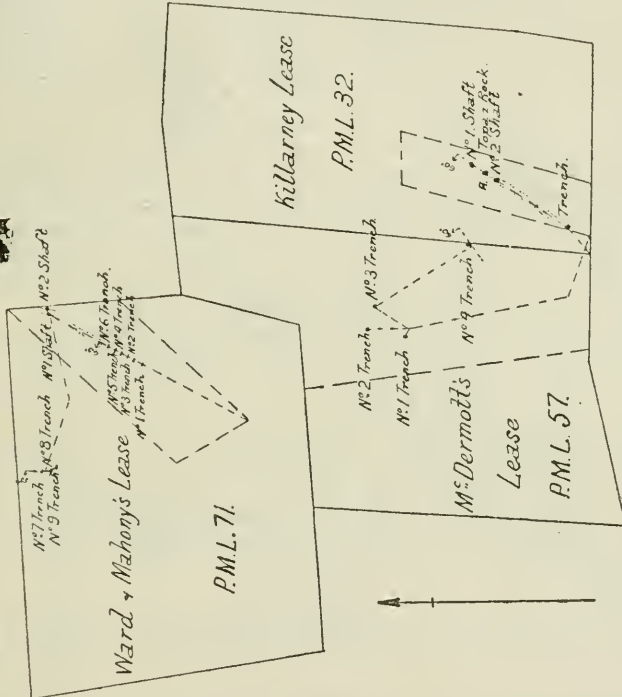
I was informed that it carried between 2 per cent. and 3 per cent. tin throughout, but unfortunately my samples (Nos. 154-160) failed to confirm this, the highest result obtainable being 0.44 per cent. tin in the north drive.

WARD'S Lease, P.M.L. 71. McDERMOTT'S Lease. P.M.L. 57. KILLARNEY Lease. P.M.L. 32 & ROB-ROY.

Parish of Ramsay County of Bourke

| Number of Sample | Name of Mine and Locality. | Assay of per cent |
|------------------|----------------------------|-------------------|
| 105 | Wards P.M.L. 71 | |
| 106 | No 1 Trench | 1.21 |
| 107 | No 2 " | 2.42 |
| 108 | No 3 " | 1.43 |
| 109 | No 4 " | 0.98 |
| 110 | No 5 " | 0.48 |
| 111 | No 6 Shaft | Trace |
| 112 | No 7 Shaft | 0.57 |
| 113 | No 8 Trench | 0.57 |
| 114 | Rob-Roy Shaft. | 0.49 |
| 115 | North Drive | 0.19 |
| 116 | " " | 0.88 |
| 117 | South " end of Shaft | 0.20 |
| 118 | North " " | Trace |
| 119 | " " | " |
| 120 | McDermott's P.M.L. 57 | |
| 121 | No 1 Trench | Trace |
| 122 | " " | " |
| 123 | " " | " |
| 124 | No 9 " | |
| 125 | Killarney P.M.L. 32 | 1.55 |
| 126 | No 1 Shaft | 0.56 |
| 127 | " " | 0.71 |
| 128 | " " | 0.56 |

Some of Wards & McDermott's samples contain some Bismuth



Scale of 5 Chains to 1 inch.

Rob-Roy Shaft

II. CARPATHIA GROUP.

The Homeward Bound Mine.

P.M.L. 2, Parish of Ramsay, County Bourke. 5 acres. Samples, 262-313.
(See drawings Nos. 8, 9, 10, and 11.)

This lease is situated immediately west of the Wild Cherry block 6 and between Wallis' P.M.Ls. 11 and 12, as shown in the locality plan drawing No. 12.

Two main shafts about 100 feet apart have been sunk to a depth of about 70 feet on a main joint in granite, striking 43 degrees and dipping west about 70 degrees. This joint has persisted from end to end of the drive (which went off it in one place) and continues into Wallis' Northern Block 12, where it has been opened in the No. 1 shaft. A plan and longitudinal elevation are given in drawing No. 9, which clearly shows the nature of the work done, and the probable occurrence of the ore.

Though the joint is persistent, it only makes ore in places, at other times being a mere thread traversing the granite. Where ore occurs it usually takes the form of a quartz-tourmaline rock in which the latter mineral is so much in excess as to give the stone a bluish opaque appearance. This vein is sometimes only a few inches wide, at other times it opens out to 3 feet or more, and in the wider portions often carries large masses of chlorite, with kaolin and decomposed kaolinized granite on either side.

It is probable that this tourmalinization has originated in places favouring the alteration and replacement of the original felspar.

Nos. 1 and 2 rises show how the richer ore has been followed and the irregular way in which it occurs.

Enlarged sketches of these rises and of the ends of the two shafts are shown in drawings Nos. 10 and 11, with the occurrence of the ore drawn to scale, and illustrate it far better than any written description. Portions of the mine which have been so far improved, are left blank in the longitudinal elevation (drawing No. 9), while its assumed extension is shown by dotted lines and the crosses adopted throughout to represent ore and altered granite.

The drive north of No. 2 shaft is interesting as the ore carries, in addition to tin, a considerable amount of lead, principally as cerussite and pyromorphite.

In places the kaolin has been replaced by hæmatite, often rich in tin.

As a general rule it has been found in this mine that where the joint opens out, and quartz-tourmaline rock occurs, good tin will be found by following it. This is shown by the samples. Very rich ore has been and is being got from here, and the mine, though a small one, is one of the best on the field outside of the companies mines.

When I left Ardlethan they had fully 60 tons of picked ore bagged for treatment, which should average at least 10 per cent. tin.

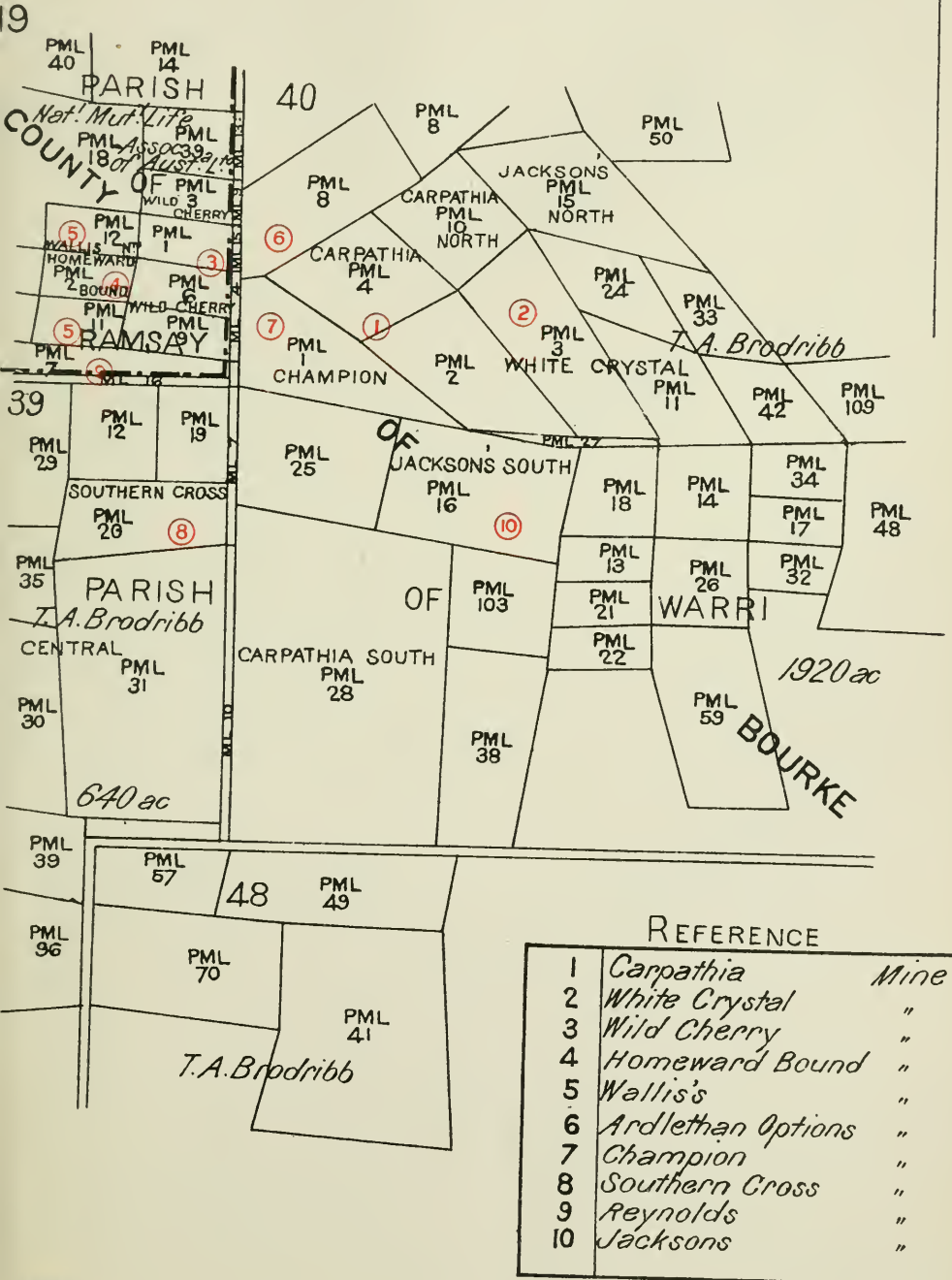
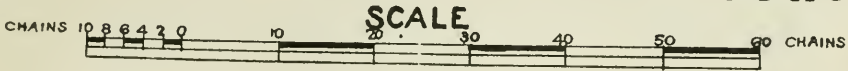
No prospecting has been done below the 70-foot level, and this work should be actively gone on with while they are still on good ore and the mine is payable.

A number of large clay floors or seams cross the shafts and rises at different points, generally having a slight southerly dip, and striking east and west. The ore will sometimes make above one of these, and only a joint below it, while in other places a seam will cut through the ore without affecting its width, but nowhere did they appear to break the continuity of the joint or show any faulting therein.

ARDLETHAN TIN FIELD

CARPATHIA GROUP OF MINES

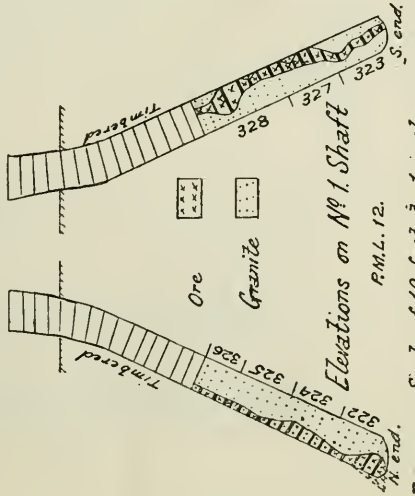
Diagram showing localities of the Leases referred to



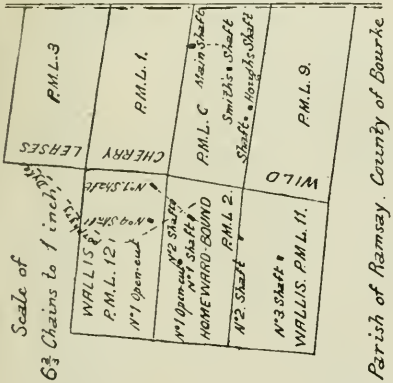
8 Details of WALLIS' MINE. P.M.L.'s 11 & 12. Parish of Ramsay. County of Bourke.

| Number Sample | Wallis' P.M.L.'s 11 & 12 | Assay of TIN Percent |
|---------------|--------------------------|----------------------|
| 317 | Locality P.M.L. 11 | 9.52 |
| 315 | " " " | 0.81 |
| 316 | " " " | 0.56 |
| 317 | " " " | 0.32 |
| 318 | " " " | 3.48 |
| 319 | " " " | 4.59 |
| 320 | " " " | 0.91 |
| 321 | " " " | 8.84 |
| 322 | " " " | 7.35 |
| 323 | " " " | 4.28 |
| 324 | " " " | 3.54 |
| 325 | " " " | 3.54 |
| 326 | " " " | 2.30 |
| 327 | " " " | 1.02 |
| 328 | " " " | 0.12 |
| 329 | " " " | 0.30 |
| 330 | " " " | 0.32 |
| 331 | " " " | 0.32 |
| 333 | " " " | 0.12 |

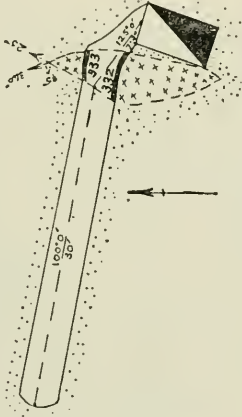
Traces of Wg & Pb. in some of these samples.



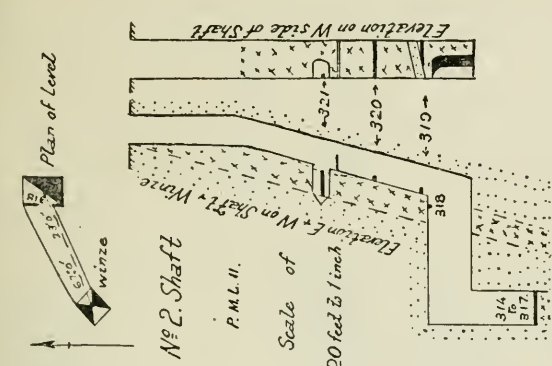
Scale of 10 feet to 1 inch



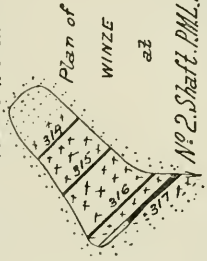
Parish of Ramsay. County of Bourke



Scale of 10 feet to 1 inch



Scale of 20 feet to 1 inch

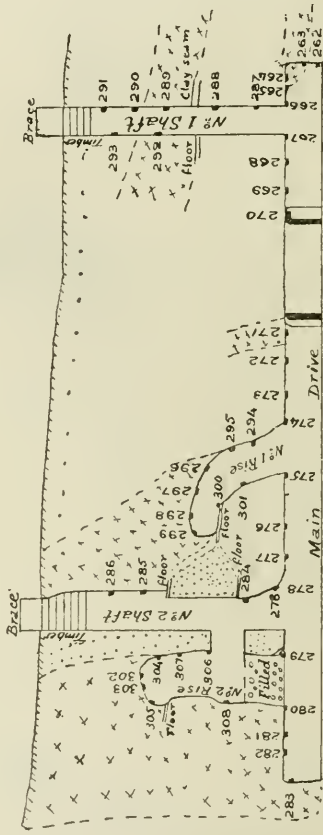


Scale of 5 feet to 1 inch

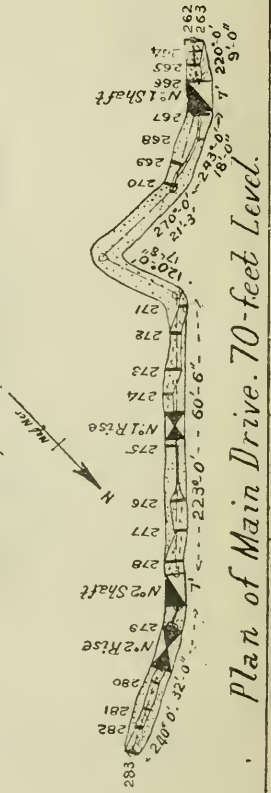
HOMeward BOUND MINE

P.M.L. 2 Parish of Ramsay County of Bourke.
 Scale of 24 inches to 1 foot

| Number of Sample | Assay value per cent | Assay value per cent |
|------------------|----------------------|----------------------|
| 262 | 1.89 | |
| 263 | Trace | Trace |
| 264 | 3.42 | |
| 265 | 4.88 | |
| 266 | 0.21 | |
| 267 | Trace | Trace |
| 268 | 0.11 | |
| 271 | 4.82 | |
| 272 | 0.50 | |
| 273 | 1.50 | |
| 274 | 1.17 | |
| 276 | 0.16 | |
| 277 | 10.31 | |
| 278 | 3.75 | |
| 279 | 2.33 | |
| 280 | 0.59 | |
| 281 | 5.98 | |
| 282 | 14.16 | |
| 283 | 3.99 | |
| 284 | 18.16 | |
| 285 | 6.47 | |
| 286 | 10.77 | |
| 287 | 3.77 | |
| 288 | 28.22 | |
| 289 | 0.51 | 0.49 |
| 290 | 0.14 | 0.10 |
| 291 | 3.38 | 1.96 |
| 292 | 3.20 | 5.32 |
| 293 | 0.81 | Trace |
| 296 | 1.81 | |
| 297 | 9.46 | |
| 298 | 18.78 | |
| 299 | 3.03 | |
| 300 | 3.23 | |
| 301 | 5.75 | |
| 302 | 1.64 | 3.11 |
| 303 | 10.84 | 3.91 |
| 304 | 1.82 | 0.91 |
| 305 | 3.73 | 4.31 |
| 306 | 13.01 | 2.16 |
| 308 | 3.60 | 0.93 |



Longitudinal Elevation
 Note- Dotted lines show possible extension of Ore.



Plan of Main Drive. 70-foot Level.

Granitic
 Ore...

It would be expected that the tin would follow these clay seams, but they have proved in every case to be barren, and to have had no effect on the values.

It is reasonable to suppose that by following the bunches of quartz-tourmaline rock and sinking the shafts to prove the ground below the present level a fairly large reserve of ore will be developed.

I consider it possible that fully 500 tons of payable ore (say, 4 per cent. tin) should be developed above the present level and by sinking another 70 feet below it.

No. 1 open-cut has been put in west across a north and south belt of blue quartz-tourmaline rock in which tin occurs. The outcrop is traceable for some distance. The quartz-tourmaline rock does not appear to be continuous, but to cut in diagonally across the tourmalinized belt, thus forming a series of bars with granite between.

The best sample taken from here only assayed 1.61 per cent. tin, and a little lead is present, but it deserves further tests.

Wallis' Mine.

P.M.Ls. 11 and 12, Parish of Ramsay, County Bourke. 10 acres.
Samples, 314-333. (See drawing No. 8.)

These leases are situated north and south of the Homeward Bound block, and have been prospected by means of four shafts and one open-cut.

No. 1 shaft in P.M.L. 12 has been sunk on the probable continuation of the Homeward Bound lode. It is 32 feet deep and follows a vein of quartz-tourmaline rock and chlorite, striking 25 degrees and dipping west 75 degrees. The vein is small, averaging about 12 inches in width, but carries good values, as evidenced by the assay results.

A porphyry dyke, referred to in a previous part of this report, sweeps round south of this shaft and turns north on the west side of it.

This and other branches of the dyke in the Champion and Carpathia leases are the only instances of true porphyry noticed on the field.

No. 2 shaft is situated in P.M.L. 11, close to the southern boundary of the Homeward Bound. From its position it would seem also to be the southern extension of the main Homeward Bound lode.

The shaft is 60 feet deep, the first 20 feet being vertical and the remainder on a dip west of 75 degrees.

It was originally sunk by the Ardlethan Options Company, who passed through the ore body and sank in the granite, keeping the lode on the hanging wall, and the work done only proved the existence of the stone without testing its value.

The owners subsequently got the mine back into their own hands, and have since driven from the bottom for 23 feet on a bearing of 247 degrees, and sunk a winze for 12 feet on a body of quartz-tourmaline rock found in the drive, obtaining some patches of good ore, which seems to occur as an isolated lens.

The ore in the shaft and winzes resembles that in the Homeward Bound, but is much harder, being a dense quartz-tourmaline rock of an opaque blue colour, and the quartz almost entirely masked by the excess of the tourmaline.

In the hanging wall of the shaft it is continuous from top to bottom, but in the drive it is cut off by a bar of granite, beyond which it makes again in the winze as shown. It seems, therefore, to resemble the occurrence in the No. 1 open-cut of the Homeward Bound.

The samples from here were generally unpayable, but two of them—one from the winze (314, assay 3.52 per cent. tin) and one from the shaft (319, assay 4.18 per cent. tin)—were payable, and systematic development should prove several payable bunches.

No. 3 shaft, situated about 184 feet south-south-west of No. 2, is about 40 feet deep, sunk vertically in granite. It was probably put down to prove the extension of the ore body in the latter shaft, as floaters of quartz-tourmaline rock are visible on the surface at intervals between the two.

A cross-cut from the bottom bearing about 100 degrees for 37 feet passed through a lens of extremely hard quartz-tourmaline rock of the usually dense nature in this mine. The samples were very poor and unpayable, and the ore body itself is probably a lens, entirely local, as shown in the sketch in drawing No. 8.

No. 1 open-cut in the south-west corner of P.M.L. 12 is 12 feet deep, sunk on an irregular body of the same characteristic blue quartz-tourmaline rock. None of the samples were payable.

Perhaps 100 tons of payable ore (4 per cent.) could be mined from here.

The Ardlethan Options Company held an option over the Homeward Bound and raised a considerable amount of ore, which was tipped on the surface. They finally abandoned the option. On going over the heaps, very rich tin was subsequently picked out, and a lot more remains in the dumps.

The Wild Cherry Tin-mining Company.

P.M.Ls. 1, 3, 6, and 9, Parish Ramsay, County Bourke. 20 acres 0 roods 17 perches. No samples taken.

In view of the objections raised to a sampling of the mine being carried out an examination was only made.

Four shafts have been sunk on this property, all in block 6. Smith's shaft starting on the outcrop of a body of ore followed it down on the underlay to a vertical depth of 100 feet.

The ore occurs along a main joint in the granite striking north, dipping east about 60 degrees to 65 degrees, and proved from this to the main shaft and 14 feet north of it, a distance of 200 feet. The main shaft is vertical, and intersected the lode at a depth of 100 feet.

The character of this lode is similar to that in the Homeward Bound, making in bunches of quartz-tourmaline rock, chlorite, kaolin, &c., in granite, but dips east, which is in an opposite direction to the Homeward Bound, and the prevailing dip of most of the north and south lines on the field. A winze sunk below the 100-foot level between the two shafts for 80 feet, following the dip, is said to carry good ore all the way down, but the lode is small.

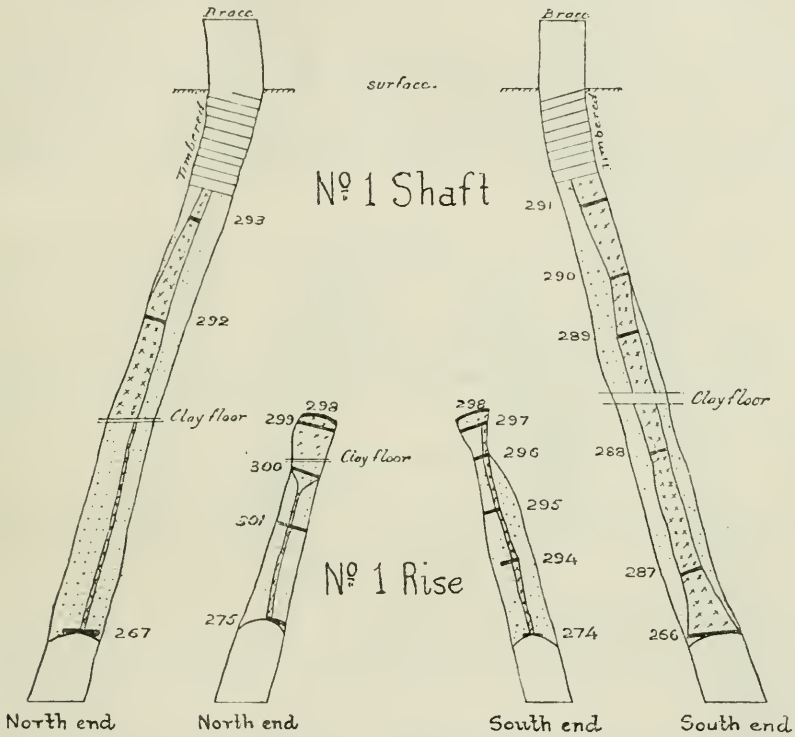
The granite on either side of the main joint has been kaolinized for about 7 feet, and is said to carry tin values up to 0.5 per cent. tin.

A parcel of 56 tons, treated at the Southern Cross battery, returned $4\frac{1}{2}$ tons of concentrates, the assay of which would be about 66 per cent. tin, giving a value of 5.3 per cent. tin to the crude ore.

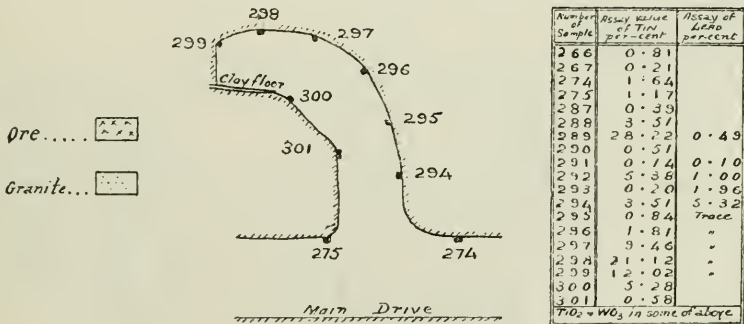
Considerable reserves of ore have been developed in the mine and others will no doubt be found on opening out at deeper levels, but in my opinion they will be essentially pocketty, and not continuous as seems to be the impression.

HOMeward BOUND MINE
 P.M.L.2. Parish of Ramsay County of Bourke.

(10)



Cross-sectional elevations on No. 1 Shaft & No. 1 Rise.



| Number of Sample | Assay value of Tin percent | Assay of Gold percent |
|------------------|----------------------------|-----------------------|
| 266 | 0.81 | |
| 267 | 0.21 | |
| 274 | 1.64 | |
| 275 | 1.17 | |
| 287 | 0.39 | |
| 288 | 3.51 | |
| 289 | 28.22 | 0.49 |
| 290 | 0.51 | |
| 291 | 0.14 | 0.10 |
| 292 | 5.36 | 1.00 |
| 293 | 0.20 | 1.96 |
| 294 | 3.51 | 5.32 |
| 295 | 0.84 | Trace |
| 296 | 1.81 | " |
| 297 | 9.46 | " |
| 298 | 21.12 | " |
| 299 | 12.02 | " |
| 300 | 5.28 | " |
| 301 | 0.58 | " |

FeO₂ & WO₃ in some of above

Longitudinal elevation on No. 1 Rise
 Scale of 10 feet to 1 inch.

Hough's shaft and another near it have been sunk near the south boundary of P.M.L. 6, both on pipes of ore pitching west and surrounded by granite. Extraordinarily rich ore was mined from Hough's shaft, but at the time of my inspection very little could be seen, and the best of it seems to have been extracted.

I have purposely used the term "joint" in speaking of the Homeward Bound and Wild Cherry ore bodies, because I do not consider that there is any real "fissure" in the accepted meaning of the term on the Ardlethan field. Only by careful geological examination and further development can this question be finally determined, but it will probably be found that neither in length, depth, nor continuity will these joints persist sufficiently to be looked upon as fissures.

C. Reynolds' Mine.

P.M.L. 7, Parish of Ransay, County Bourke. 9 acres 0 roods 23 perches.
No samples.

This lease adjoins Wallis' P.M.L. 11 on the south, and has been prospected by shafts and trenches to a depth of about 30 feet.

A patch of hard blue quartz-tourmaline rock was found, but so far no ore containing payable tin has been mined, and the occurrence seems to resemble that in Wallis' No. 3 shaft.

No quantity of payable ore can be counted on from here.

The Ardlethan Options Mine (now Gill's Eureka).

P.M.L. 8, Parish Warri, County Bourke. 19 acres. (See drawing No. 12.)

This adjoins the eastern boundary of the Wild Cherry leases and the north-west boundary of the Carpathia lease.

A shaft was sunk close to their south-west corner peg, on a rich flat pipe of tin, which has gone into the Cherry ground, and is therefore no longer available.

A considerable amount of trenching and costeeing has been done on the lease, but at the time of my inspection tin was being obtained only in Nos. 1 and 2 cuts (see drawing No. 12).

No. 1 cut was 5 ft. 6 in. deep, 6 feet long, 9 feet wide at the top, and 3 feet at the bottom.

Three samples were taken across the bottom, in kaolin and decomposed granite; the assays varied from 0.48 to 1.94 per cent. tin. This appears to be a pipe, and is insufficiently prospected to know whether it will develop into one of any magnitude.

No. 2 cut was 7 feet long, 9½ feet deep, and 2 ft. 3 in. wide at the bottom. Two samples composed of four cuts were taken, where the manager stated that the best values occurred, but the assays only gave traces of tin. This also seems to be a small pipe of ore in decomposed granite, pitching north.

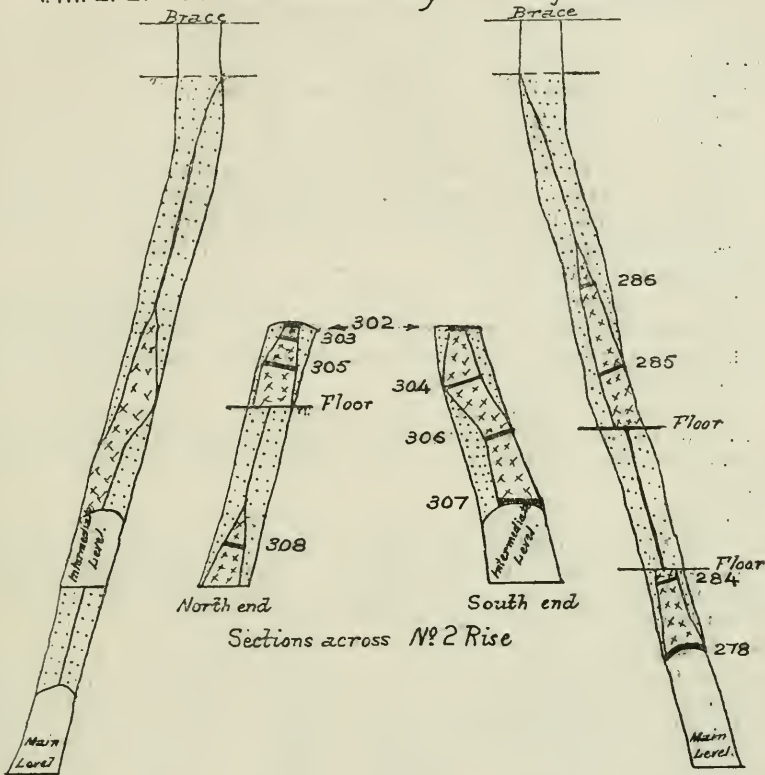
150 tons of very rich ore are reported in the papers to have been raised this month (October). If this be so, it is probable that one of the above pipes has opened out and proved to be of considerable importance.

In the absence of more definite information the mine can be credited with 150 tons of payable ore, though I am of opinion that the quantity has been exaggerated. This lease being on the north-west fall of the main Carpathia Hill, in a belt of granite and greisen, offers considerable scope for further prospecting, and other payable pockets may be found.

HOMeward BOUND MINE

(11)

P.M.L. 2. Parish of Ramsay. County of Bourke

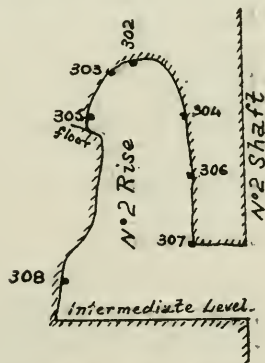


North end

South end

Sections across No. 2 Shaft

| No. of Sample | Assay Sn percent | Assay Pb percent |
|---------------|------------------|------------------|
| 278 | 5.79 | |
| 284 | 8.10 | 3.83 |
| 285 | 6.43 | 0.96 |
| 286 | 5.77 | 0.64 |
| 302 | 5.79 | |
| 303 | 1.64 | 2.11 |
| 304 | 10.12 | 3.01 |
| 305 | 2.82 | 0.91 |
| 306 | 9.79 | 4.31 |
| 307 | 13.01 | 2.16 |
| 308 | 3.60 | 0.93 |



Ore

Granite

Sectional elevation through No. 2 Rise
Scale of 10 feet to 1 inch

The Champion Mine.

P.M.L. 1, Parish Warri, County Bourke. 17 acres 3 roods 15 perches. Samples, 334-346. (See drawing No. 12.)

A great deal of surface work has been done on this lease. Some rich slugs and "spuds" of tinstone were found, and shafts and trenches sunk apparently to locate the lodes from which they came. For this reason a great deal of work has been done, which has not been productive.

The principal workings on the lease consist of a large open-cut, situated as shown in the locality plan (drawing 12), driven almost due north for 136 feet into the side of the hill and terminating in a crescent-shaped tunnel 25 feet long. The cut is in partially decomposed granite for the first 113 feet, the remainder being in slate and siliceous schists of all colours, traversed by ironstone seams and clay bands, the latter pitching south at an angle of about 35 degrees.

The granite appears to cross the schist on a bearing more or less east and west, as the contact shows again in the No. 4 shaft of the Carpathia Mine.

The schist is probably a spur off the main range of sedimentary rock on which the Southern Cross is situated.

I was informed that the dump from the open-cut contained 3,000 tons of 3 per cent. tin ore. The workings were carefully sampled by means of ten diagonal cuts (samples 334-343), and the highest assay gave only 0.32 per cent. tin.

No. 1 shaft bears 122 degrees, 242 feet from the datum point at the open-cut. This shaft is vertical and about 50 feet deep. Good tin ore was obtained on the surface, but the shaft passed out of it below the fourth set. A drive and cross-cut were afterwards put in from the bottom, apparently with the intention of cutting the pipe, but failed to do so.

Mr. Arkinstall, who took charge of the mine while I was at Ardlethan, found, on examination, that good tin ore was showing between the second and fourth sets on the east end of the shaft, and started to open out on it. Two samples taken from here by me gave assays of 6.05 and 8.49 per cent. tin. The ore is very dirty as it carries a great deal of arsenic and some copper, probably in the form of arsenate of copper. If the pipe is any size a fair tonnage of ore may be won from here.

An outcrop of quartz-tourmaline rock, which should be prospected, shows near the shaft, traceable for some distance east and west, and the porphyry dyke mentioned before in this report can be seen just north of it.

No. 2 trench or open-cut was reported to carry good tin. It is about 7 feet deep, 8 feet long, and 5 feet wide, sunk in a mixture of partly decomposed granite and greisen, the colours varying from red, pink, and puce to yellow and white, and traversed by small ironstone seams.

The samples from this trench only assayed 0.14 per cent. tin.

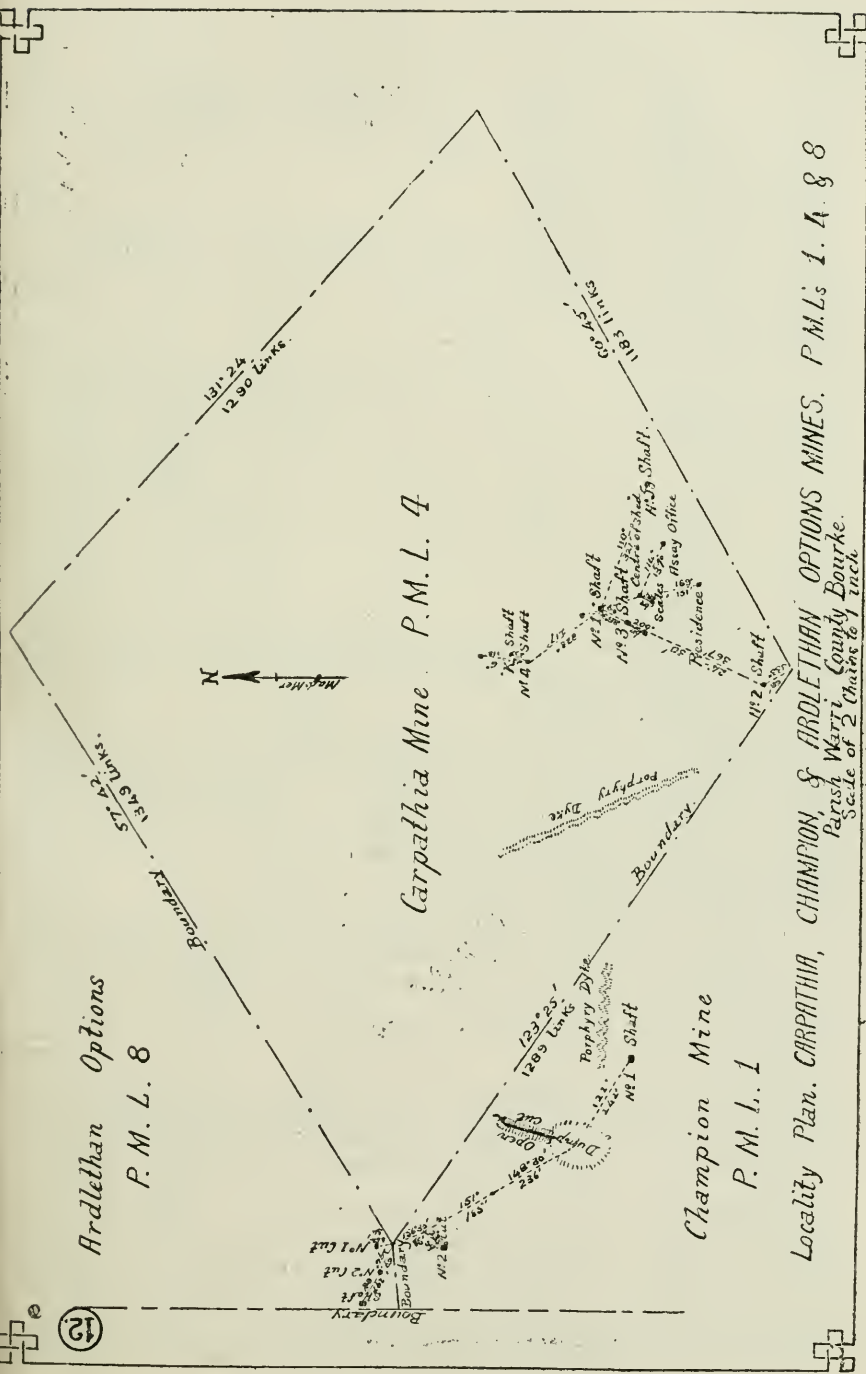
None of the other workings on the mine carried any values and were not sampled.

Perhaps 40 tons of payable ore could be counted upon from this mine.

The Carpathia Tin-mining Company.

P.M.L. 4, Parish of Warri, County of Bourke. 15 acres 0 roods 20 perches. Samples, 412-431. (See drawings Nos. 12, 13, and 14.)

Whether it be considered from the point of view of size, permanency, or richness, this mine is undoubtedly one of the best and most promising on the field. It has not been over-capitalised, and has already returned hand-



Ardlethan Options
P. M. L. 8

Carpathia Mine P. M. L. 4

Champion Mine
P. M. L. 1

Locality Plan. CARPATHIA, CHAMPION, & ARDLETHAN OPTIONS MINES. P. M. Ls 1, 4 & 8
Parish Warrig, County Bourke.
Scale of 2 Chains to 1 Inch

(12)

some dividends to the shareholders. The amount of ore mined since the inception of the company has not been great, but it is so phenomenally rich that it is the equivalent of a very much larger tonnage of poorer ore.

It has already been stated that this hill probably represents the main focus of precipitation of the tin on the Ardlethan field, and the Carpathia lease has been fortunate enough to embrace the best of these deposits.

The principal workings on the mine consist of six shafts with accompanying open-cuts, stopes, &c.

The positions of these are shown in locality plan No. 12, and the details of Nos. 1, 3, and 4 shafts and workings in sketches Nos. 13 and 14.

No. 1 shaft is 100 feet deep, sunk on an ore body dipping west about 75 degrees. Good ore was obtained all the way down, but granite came in on the south end below the intermediate level.

Above the intermediate level a stope has been carried up to the surface north of the shaft, leaving a pillar of ore against the shaft to protect it.

At the 100-foot level, drives have been put in north and south, and two large ore bodies are being stoped as shown in the sketch plan and elevation (No. 13 drawing). There seem to be two distinct makes, separated by a bar of granite. The northern one should go up to the intermediate level, and the southern will probably connect with the open-cut at No. 3 shaft.

They both seem to be irregular pipes or bunches of very large dimensions, caused by tourmalinization of the granite, the ore itself being a quartz-tourmaline rock, in which the latter mineral is so much in excess as to often become massive.

A pass leads down from the stope in No. 3 shaft to the south drive of No. 1 shaft for extraction purposes, but as this goes through granite all the way it looks as though the two ore bodies were distinct, the former riding over the latter with granite between.

A winze sunk for 57 feet beneath the 100 level, and which will ultimately be connected with and become the continuation of No. 1 shaft, passed through blank country (granite) to within 6 feet of the bottom, where a quartz-tourmaline ore body was cut, carrying tin and a great deal of wolfram. It had not been sufficiently developed to determine its size or importance when I inspected the mine, but should prove to be the downward continuation of the northern pipe.

Three samples were taken right across the back of the northern stope at each end (Nos. 419, 426, and 427). They were all poor, the highest only giving a return of 0.76 per cent., but richer patches are obtainable, and the ore is picked over on the surface and only the best of it bagged and sent away for treatment.

A sample (No. 418) taken in the south end of the south stope assayed 1-10 per cent. tin.

As the ore remaining above the 100 level is limited in extent, the future of this shaft will depend upon the amount of ore developed in the winze. When the granite comes in it does so in step-like blocks and cuts the ore off very abruptly, and the tonnage obtainable is therefore an unknown quantity.

No. 2 shaft has been sunk to a total depth of 65 feet on an irregular pipe, pitching 58 degrees on a bearing of 120 degrees, and driven 20 feet at the bottom on a spur of ore bearing 208 degrees, but cutting out in the face. Good ore still remains underfoot, but the pipe is purely local, being surrounded by granite, the shaft itself representing the size of the ore body.

Official bulk assay figures given to me by the manager show that 84 parcels of ore raised from here averaged about 6 per cent. tin.

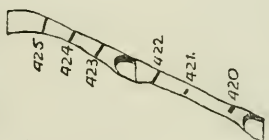
Detail sketches of Nos 1 and 3 Shafts, CARPATHIA MINE, F.M.L. 7, Parish of WARRI, County of DUFFRKE.

Sketch Plan of 100-foot Level, No 1 Shaft.



Scale of 40 feet to 1 inch

Elevation on North end of No 1 Shaft



Longitudinal elevation of

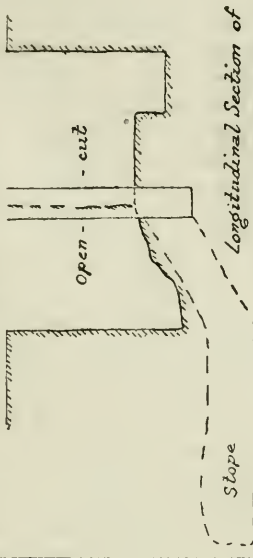
No 1 Shaft and Workings

Rise... [Symbol] Winze... [Symbol] Shaft... [Symbol]
 Filling... [Symbol] Ore... [Symbol] Granize... [Symbol]

Sketch Plan of Open-cut and Slope No 3 Shaft.



Scale of 40 feet to 1 inch



Longitudinal Section of Open-cut at No 3 Shaft

| Number of Sample | Assay of Tin Per-cent | Assay of Copper Per-cent | Assay of Manganese Per-cent | Assay of Lead Per-cent | Assay of Zinc Per-cent | Assay of Silver Per-cent | Assay of Gold Per-cent |
|---|-----------------------|--------------------------|-----------------------------|------------------------|------------------------|--------------------------|------------------------|
| | | | | | | | |
| x 920 | 2.56 | Trace | 0.17 | | | | |
| x 921 | 3.19 | " | | | | | |
| x 922 | 3.34 | " | | | | | |
| x 923 | 7.11 | " | 0.31 | | | | 0.52 |
| x 924 | 29.11 | 0.20 | 0.74 | | | | 2.25 |
| x 925 | 10.29 | Trace | 7.95 | | | | 2.20 |
| x 927 | 0.21 | | 0.97 | | | | |
| Samples marked x contain traces of Platinum | | | | | | | |
| x 912 | 2.83 | Trace | 0.25 | | | | |
| x 913 | 18.70 | | | | | | |
| x 914 | 13.94 | | | | | | |
| x 915 | 3.99 | | | | | | |
| x 916 | 4.83 | | | | | | |
| x 917 | 1.10 | | | | | | |
| x 918 | 0.76 | | | | | | |
| x 919 | 0.10 | | | | | | |
| Samples marked x contain traces of Platinum | | | | | | | |

(12)

No. 3 shaft started in the centre of a large outcrop of ore, and followed it down on a southerly flat pitch, as shown in the sketch plan and longitudinal section on drawing No. 13. The surface ore was mined by an open-cut and yielded a great deal of extremely rich ore. Some of this remains in the south and north ends of the cut and in a cut behind the shaft, where one sample (416) assayed 42.93 per cent. tin.

Three samples (Nos. 412-413-414) were taken across the back of the stope and assayed 2.85, 18.70, and 13.93 per cent. tin. All the ore has practically been removed up to the back, and only a limited amount (which will shortly be worked out) remains between it and the surface.

This also is a dense irregular quartz-tourmaline ore body in granite, which cuts it off abruptly against step-like heads or joints.

No. 4 shaft is about 200 feet deep, sunk on a pipe of ore formed on the contact between the schist and granite. The shaft goes down vertically for 20 feet, then dips west 80 degrees for about 100 feet, following the contact, then dips south 70 degrees for about 80 feet following the pipe, which has been stoped from the bottom upwards for about 20 feet, at which place the shaft has been sollared over and a drive put in for 30 feet south along the contact, and a cross-cut driven east for a few feet from the end of the drive. Details of the shaft and workings are shown in drawing No. 14.

The contact rock is a granite-schist-breccia, easily followed. The ore is limited in size, and most of it has been taken out from the surface to a depth of 120 feet. A fair amount of ore remains to be mined on the hanging wall of the shaft from this point to the main level. This pipe has been very rich, but the tin is not clean, being associated with copper, lead, bismuth, wolfram, and titanium.

Bulk assays of 172 parcels of ore raised and despatched from this shaft up to 5th August last gave an average of over 6 per cent. tin.

No. 5 shaft is sunk for 100 feet on a typical pipe, which went down vertically for 15 feet, then for 85 feet on a pitch of 50 degrees, bearing 200 degrees. The ore, which is about 6 feet long and 4 feet wide, was completely mined as the shaft was sunk, but is still going down underfoot and may continue yet for some depth. Bulk assays of 117 parcels of ore sent from here averaged over 4 per cent. tin.

"K" shaft, near No. 4, has yielded some good ore, but I did not sample it, as it was not payable at the time of my inspection.

In much of the granite surrounding the ore, especially at the Nos. 1 and 3 shafts, the mica is so deficient as to be invisible to the naked eye, and the rock is therefore generally spoken of and described as porphyry. Microscopic examination shows, however, that it is a granite.

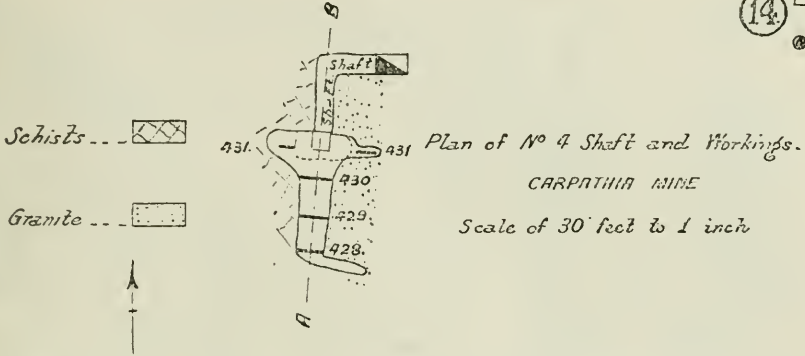
Where the felspar has become kaolinised against the quartz-tourmaline rock, tin can be obtained in the granite, but does not penetrate into the unaltered rock.

The only true porphyry visible on the lease outcrops not far from No. 4 shaft, and runs towards No. 2 shaft past the benzoline store.

The Carpathia Mine is undoubtedly a good one and will continue for some time to produce a considerable tonnage of payable ore, but being essentially a series of pipe deposits, they must be expected to sooner or later cut out abruptly against the granite. Fortunately the lease still gives ample scope for further prospecting and other payable shoots may be found, especially on the contract line and where outcrops of quartz-tourmaline rock are showing.

This company's battery is situated at Barmedman, to which the ore is conveyed by rail.

14

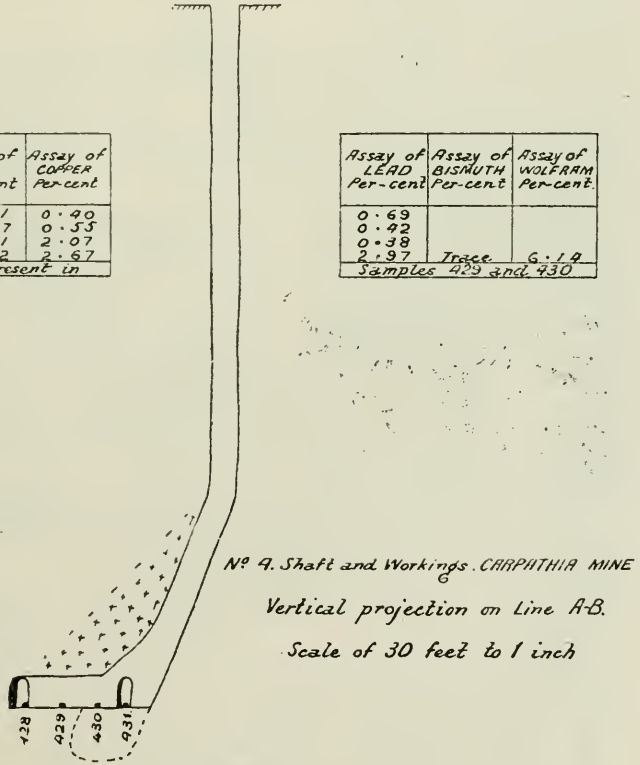


| Number of Sample | Assay of TIN Per-cent | Assay of COPPER Per-cent |
|------------------|-----------------------|--------------------------|
| 428 | 7.31 | 0.40 |
| 429 | 4.97 | 0.53 |
| 430 | 2.61 | 2.07 |
| 431 | 10.62 | 2.57 |

Note: FeO₂ is present in

| Assay of LEAD Per-cent | Assay of BISMUTH Per-cent | Assay of WOLFARM Per-cent |
|------------------------|---------------------------|---------------------------|
| 0.69 | | |
| 0.42 | | |
| 0.38 | | |
| 2.97 | Trace | G. 1.4 |

Samples 428 and 430



Detail Sketches of No 4. Shaft and Workings.
CARPATHIA MINE. P.M.L. 4. Parish of WARRI County of BOURKE.

White Crystal Tin-mining Company.

P.M.Ls. 2, 3, 10, 11, and outside blocks, Parish of Warri, County Bourke. 62 acres 3 roods 21 perches. No samples. (See drawing No. 15.)

This mine originally consisted of P.M.Ls. 2, 3, and 11, but the company subsequently bought some other blocks covering their water-catchment area, which they now own as a freehold.

Most of the mining has been confined to P.M.Ls. 2 and 3, where three "lodes" have been opened, known respectively as "The Copper Lode," "Stacpoole's," and "Murphy's," and on P.M.L. 2 a prominent rocky hill is situated, which has been tunnelled, trenched, and prospected in many places. I did not sample this mine as objections were raised to my doing so, but a careful examination was made in company with the manager, Mr. W. Gullock, who gave me all the information in his power.

The copper lode outcrops near the east corner of the Carpathia lease and can be traced both north and south for some distance. It forks near this corner, and going south splits into two separate portions. It carries copper, tin, wolfram, and other minerals in a siliceous and felsitic base. The company is not working this lode at present, and no extensive prospecting has been done on it.

Stacpoole's shaft and another, about half a chain south of it, represent the original sites where tin was found on the lease, and from the latter shaft tin ore to the value of £3,760 was taken out in sinking to a depth of 33 feet.

On taking over the mine the company followed Stacpoole's lode down on the underlay to a vertical depth of 100 feet by means of the shaft of the same name, which was subsequently connected to the main shaft by a cross-cut as shown in the sketches.

The cross-cut passed through the lode for about 16 feet, representing a width of about 12 feet at right angles to its dip, and rich ore is obtainable on both ends of the shaft from the cross-cut to the surface, but as it has not been driven on it is impossible to say how far it will continue. An outcrop of blue quartz-tourmaline rock is traceable at intervals to another shaft 276 feet further south, where some good ore was obtained. It is probable that this ore body exists in the characteristic pipe form common to the field.

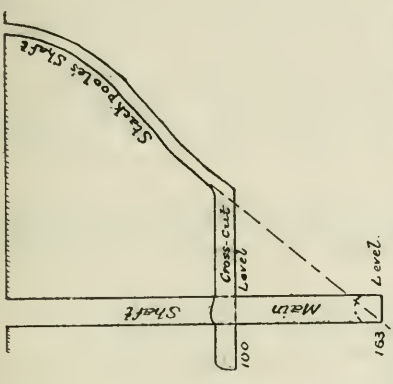
The main shaft has been sunk vertically to a total depth of 163 feet, and a make of ore was intersected here on a head striking 50 degrees and dipping south-east 80 degrees, starting from a wall on the west end of the shaft, striking 15 degrees and dipping west 70 degrees (see sketch).

This is generally considered to be a new make of ore, but my survey notes seem to show that it is the downward projection of Stacpoole's lode. Further development will be necessary to determine this.

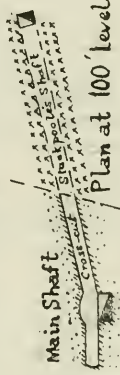
The ore is very dirty, containing copper, arsenic, tungsten, bismuth, and other impurities, and may require roasting to bring the tin concentrates to a high grade.

Murphy's shaft is sunk on a quartz-tourmaline outcrop on the eastern slope of the hill, and some good ore is said to have been obtained. It could not be inspected owing to foul air.

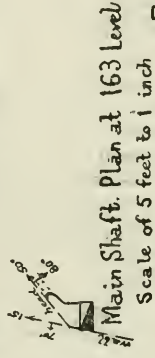
The White Crystal hill, which is rocky and precipitous, is a prominent feature of the landscape. It is usually spoken of as a quartz-porphry, but microscopic examination of typical rock sections proves it to be an altered granite, partly tourmalinized, the blue colour showing in much of the rock being due to finely divided tourmaline. The felspar in the original granite seems to have been completely decomposed and replaced by silica, thus recementing the quartz and forming the rock as it now exists. It is much



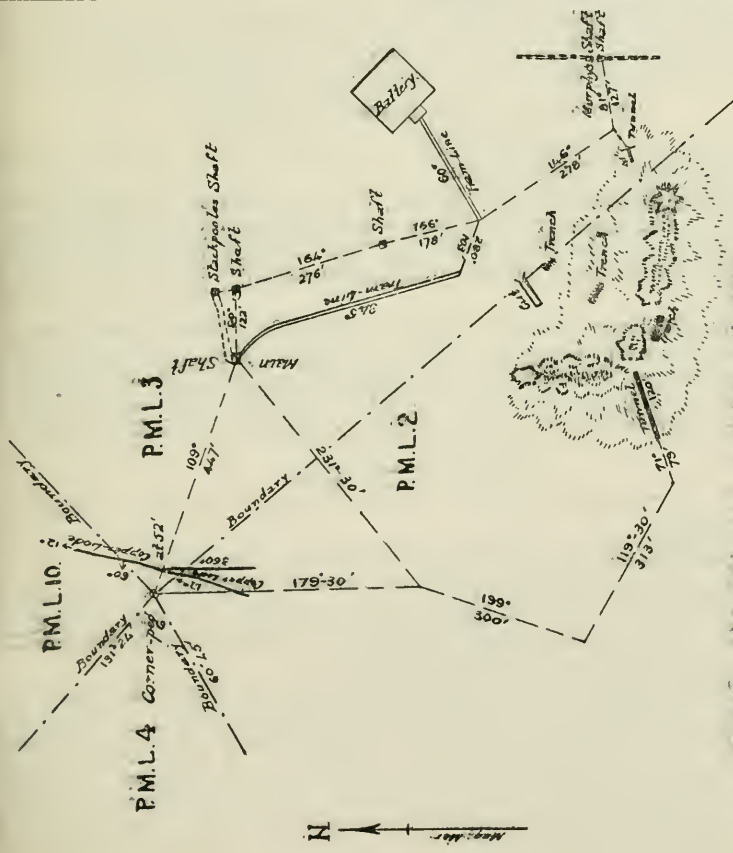
Elevation E & W on Main Shaft
Scale of 5 feet to 1 inch



Plan at 100' level



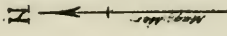
Main Shaft. Plan at 163 Level
Scale of 5 feet to 1 inch



WHITE CRYSTAL TIN MINING COMPANY.

P.M.L.'s 2 & 3. Parish of Warri, County of Bourke

Scale of 20 feet to 1 inch



honeycombed, and contains numerous small vughs full of quartz crystals, and carries tin. It is stated that the whole hill carries tin values averaging 1 per cent., but I am of the opinion that this estimate is excessive.

A tunnel 120 feet long has been driven into the lill from the west end, and a short one 40 feet long from the east end; the values obtained were very small. Several trenches have been cut across a soft belt of rock running through a gap in the centre of the hill, which is thought to mark the line of Staepoole's lode.

A very good mill has been erected, consisting of rock-breaker, ten head of stamps, three tin jigs, grinding pan, classifiers, five Wilfley tables, and two double-belt Luhrig vanners and accessories. It is driven by a Hornsby gas engine.

A 25,000-yard tank has also been excavated, and generally speaking the whole treatment plant is a good one and a credit to the company.

The manager already has a large reserve of ore stacked at the surface, and several faces of ore ready for stoping.

The future of the mine depends largely upon the size of Staepoole's ore body and the values contained in the hill, which could supply an enormous quantity of cheaply-mined ore if it carries the values claimed for it.

The Southern Cross Tin-mining Company.

P.M.Ls. 19 and 20, Parish Warri, County of Bourke. 22 acres 0 roods 21 perches. Not sampled.

This mine is situated about a quarter of a mile south of the Wild Cherry main shaft. The leases are on a spur consisting entirely of siliceous sedimentary rocks, and the tin found so far has occurred in pockets. At the time of my visit no parts of the mine carried payable ore, and no samples were taken.

The company has erected a small but serviceable crushing plant, and is prepared to crush for the public. Only a few parcels of ore have been treated owing to shortage of water. The manager has lately improved his water catchment by extending the drains round the flanks of the hill, but since doing so no rain has fallen, and the field is suffering from a severe drought.

Jackson's South Mine.

P.M.L. 16, Parish of Warri, County Bourke. 25 acres. Samples, 352-355.

This lease adjoins the White Crystal P.M.L. 2 on the south.

A shaft has been sunk bearing 35 degrees about a quarter of a mile from the highest point on the White Crystal Hill to a depth of 45 feet. It passed through 12 feet of loam, then through 19 feet of alluvial wash, the last 13 feet being in bed rock, consisting of granite.

The alluvial portion was evidently detrital matter from the Carpathia and White Crystal hills, as it contained the characteristic rocks found on both of these, and the angular nature of much of the granite and quartz fragments was proof that it had not travelled far. I was informed that samples taken from here assayed 3 per cent. tin, but though I took most careful, consistent, and heavy samples from top to bottom, the best result taken from the bottom 5-foot section only assayed 0.67 per cent. tin, and dish prospects confirmed these low results.

After the discovery of this alluvial deposit, several other shafts were sunk further south to pick up its continuation, but so far as I could learn they were not successful, and I am of opinion that it is only a basin of no great area and does not represent an old river bed.

ARDLETHAN TIN FIELD

TAYLORS HILL GROUP OF MINES

Diagram showing Localities of the Leases referred to

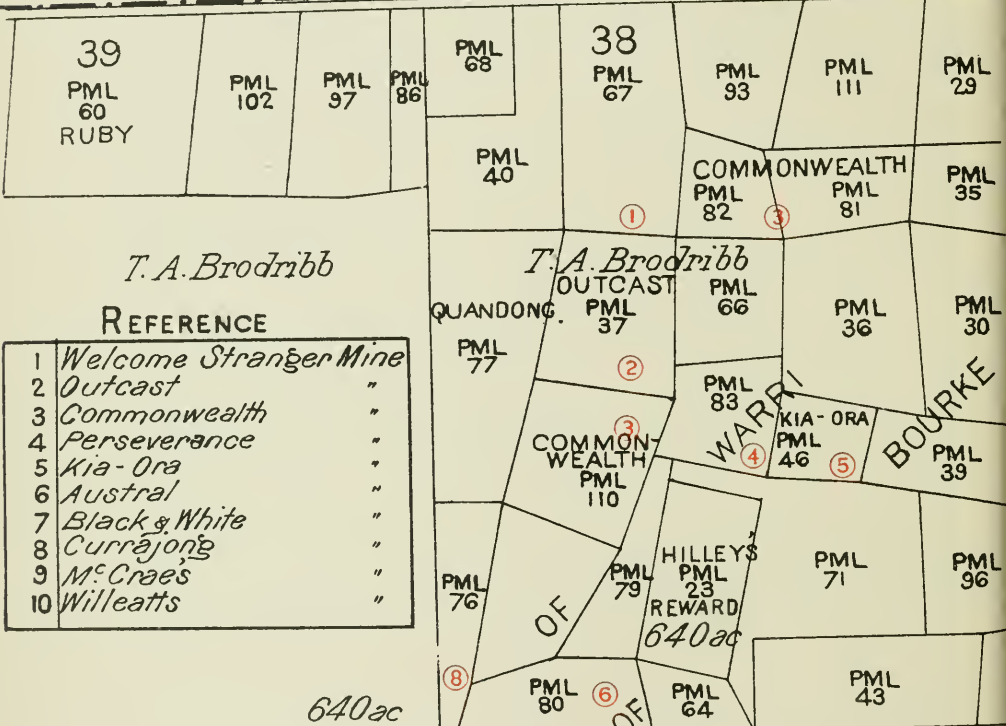
39 PARISH
COUNTY

T.A. Brodribb
PML 36 OF PML 29

PML 62

PML 13 PML 55

1090 a. 2. r. 0 p
BOURKE

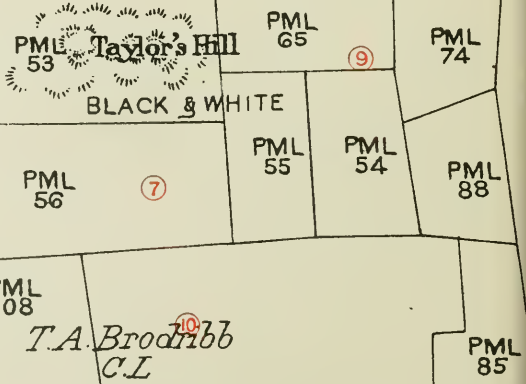


T.A. Brodribb

REFERENCE

| | |
|----|-----------------------|
| 1 | Welcome Stranger Mine |
| 2 | Outcast |
| 3 | Commonwealth |
| 4 | Perseverance |
| 5 | Kia-Ora |
| 6 | Austral |
| 7 | Black & White |
| 8 | Currajong |
| 9 | M. Crae's |
| 10 | Willeatts |

49 PARISH
COUNTY



RAILWAY

1237 a. 3 r. 30 p ex rail

III. TAYLOR'S HILL GROUP OF MINES.

The Welcome Stranger.

P.M.L. 67, Parish Warri, County Bourke. 31 acres 2 roods 27 perches. Samples, 190. (See drawing No. 16.)

This lease was originally held by G. Blundon and others, but was subsequently abandoned. Two shafts and two trenches were put down on the southern continuation of the main outcrop of the Outcast lease. I was informed that good tin ore was obtainable in No. 2 shaft, which is 15 feet deep and sunk on an irregular body of quartz-tourmaline intermixed with granite and intersected by a series of heads—one of these striking north-east and dipping south-east 70 degrees was followed. Most of the shaft was in granite, but near the bottom a small hole has been driven on stone, a sample taken from here assayed 0.32 per cent. tin. The other workings were stated to be unpayable, and were not sampled.

This mine is chiefly interesting owing to the occurrence of a greenish-yellow mineral which coats the masses of tourmaline lying in the joints. This mineral was examined by Mr. Card, and identified as a hydrous arsenate of copper and iron, similar to previous specimens found on the field by the Under Secretary for Mines. It can be found, principally as stains and discolourations, in many parts of the field.

The Outcast Syndicate.

P.M.L. 37, Parish Warri, County Bourke. 23 acres 0 roods 23 perches. Samples, 169-189. (See drawing No. 13.)

A great deal of work has been done on this lease, which adjoins the Welcome Stranger on the north. Three more or less defined belts of tin-bearing rock have been followed. The central one, on which No. 1 shaft is sunk, and the western one, where Nos. 9 and 10 trenches are situated, being especially persistent and well defined, consisting of quartz-tourmaline rock very similar to the outcrop on the Big Bygoo lease.

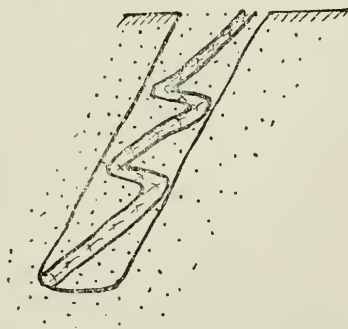
No. 1 trench is opened on the north end of a belt of quartz-tourmaline rock in granite; good tin was obtained in the loam, but did not go into the stone. No. 2 trench, about 10 feet deep, is sunk on a wolfram deposit pitching south-south-west; it is a pipe about 3 feet long and varying from 2 to 12 inches in width. It is surrounded by barren granite, and as it was visibly payable and very limited in size it was unnecessary to sample it.

No. 3 trench is also on a pipe of wolfram, which has since been proved to a depth of 24 feet, with a general pitch south-south-west. The ore itself zigzags in a peculiar manner inside the confines of the pipe, as shown in the accompanying sketch.

The pipe is about 4 feet long, and the ore varies in width from 1 to 14 inches. It is of good grade, and payable, but the quantity obtainable is small, and it was unnecessary to sample it.

Both these pipes are being worked on terms by a party of tributers.

Nos. 4, 5, and 6 trenches are put down on joints in granite where local greisenization had taken place. Practically all the payable ore from these has been sent away, and the stone remaining in the trenches is reported to be unpayable—so they were not sampled.



No. 7 trench is not on any ore body, but some extraordinarily rich "spuds" of tinstone were found here in the loam filling a crevice in the granite. These have all been bagged and sold.

No. 8 trench, near the boundary, is on an ill-defined body of quartz-tourmaline rock, but is stated to be unpayable.

Nos. 9 and 10 trenches are on a fairly wide outcrop of quartz-tourmaline rock, which dies out going north, but can be traced more or less prominently for about half a mile south along the main spur leading to the west end of Taylor's Hill. In some places the outcrop is very wide; in others it narrows down into a mere joint in the granite; sometimes it is pure quartz-tourmaline rock, at others (and noticeably at the south end in the Currajong lease) it is all greisen. It finally cuts through a gap in Taylor's Hill, and disappears on the south fall. It has been opened in the Commonwealth lease (P.M.L. 110) and in the Currajong lease (P.M.L. 76), and rich pockets of ore were found, but did not go down. The samples taken from the outcrop in the trenches 9 and 10 were not payable.

Nos. 11 and 12 trenches are on local joints of altered granite, and all the payable stone is stated to have been mined.

Nos. 13, 14, and 15 trenches and No. 1 shaft, as well as samples A to F, are on a very prominent outcrop of quartz-tourmaline rock, which can be traced from trench 13 to the Welcome Stranger, a distance of some 800 feet. Very rich specimens, "slugs" and "spuds," of tin ore were picked up on the west slope of the hill, on the outcrop and below it, and some good ore was mined and bagged from the open cuts. The surface width of the outcrop is considerable, but much of it is in the form of "floaters," which have rolled down the hill. The trenches prove the solid stone to be about 12 feet wide.

No. 1 shaft is about 37 feet deep, and a cross-cut has been put in for about 12 feet west some 8 feet up from the bottom. The stone dips down under barren granite in the end.

This shaft is interesting as an example of the irregular manner in which the quartz-tourmaline rock occurs in the granite, and is clearly illustrated in the perspective sketch of the shaft shown in drawing No. 16. Also from the fact that a bunch of topaz rock carrying tin was found at a depth of about 32 feet from the surface. More or less horizontal joints cross the stone at irregular intervals, and it is near these that the best values are said to be found. The shaft as well as the outcrop between it and No. 14 trench were reported to carry between 2 per cent. and 3 per cent. tin values throughout. Close sampling was therefore carried out for a length of 350 feet along the outcrop (Samples 169-187), but the results were very disappointing, the highest giving 0.92 per cent. tin.

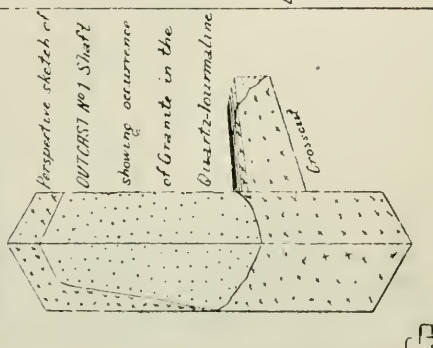
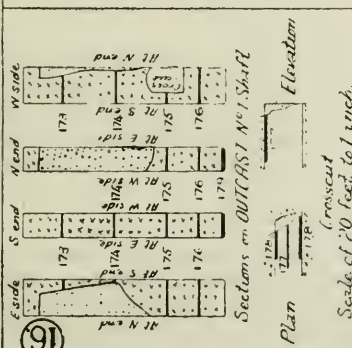
No. 2 shaft is 19 feet deep, put down on a tin lode which turned to wolfram, but at the bottom it became very small and broken, and cannot be traced downwards. Some rich ore was bagged from here. Prospecting is being carried on to follow its continuation north.

A good tonnage of stone is lying about near the trenches and shafts in different parts of the lease, and is spoken of as 2 per cent. ore, but inspection shows that most of it is very lean and poor.

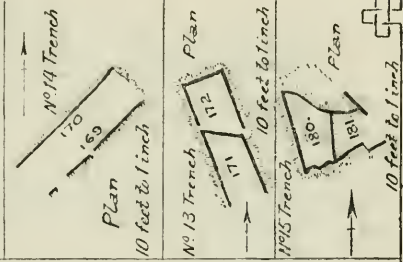
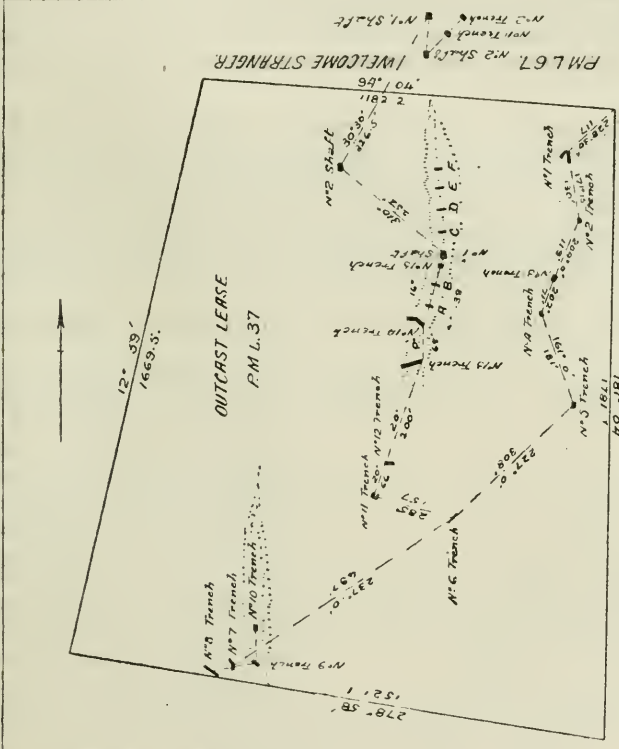
It might be possible to pick 50 to 100 tons altogether of payable stone from these heaps, by careful selection.

No doubt other pockets of payable ore will be found from time to time, but the output from the mine is not likely to be large.

OUTCAST MINE P.M.L. 37 and WELCOME STRANGER MINE P.M.L. 67. Parish Warrir. County Bourke.



| Number of Sample | Locality of Sample | Assay of per-cent TIN |
|------------------|---------------------|-----------------------|
| 160 | No. 14 Trench | Trace |
| 171 | " | 0.52 |
| 172 | No. 13 | Trace |
| 173 | No. 1 Shaft | 0.11 |
| 174 | " | Trace |
| 175 | " | 0.20 |
| 176 | " | Trace |
| 177 | " | 0.51 |
| 178 | " | Trace |
| 179 | No. 5 Trench | 0.19 |
| 180 | " | Trace |
| 181 | OUTCAST No. 1 Shaft | 0.15 |
| 182 | " | Trace |
| 183 | " | 0.42 |
| 184 | " | Trace |
| 185 | " | 0.38 |
| 186 | " | Trace |
| 187 | No. 9 Trench | 0.38 |
| 188 | " | Trace |
| 189 | No. 10 | 0.65 |
| 200 | No. 14 Trench | 0.32 |



Scale of 3 Chains to 1 inch

Quartz-tourmaline

The Commonwealth Mine.

P.M.Ls. 66, S1, S2, 93, 110, 111, Parish Warri, County Bourke. 103 acres 2 roods 36 perches. Samples—none taken.

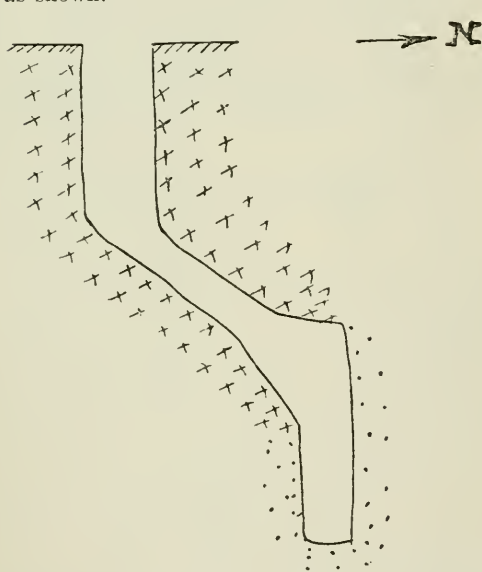
This property consists of six leases adjoining the Outcast on the north-east, the east, and the south.

P.M. leases S1, 93, and 111 are all in a belt of sedimentary country which cuts through the granite in a north-westerly direction. P.M.L. 82 embraces the junction of the granite and sedimentary schists. The other leases are in the granite belt.

Payable tin has only been found in P.M.Ls. 66 and 110, and the former block has been the more extensively worked, and yielded the larger quantity of ore.

In P.M.L. 66 three shafts have been sunk and several trenches opened on and near a prominent outcrop of quartz-tourmaline rock. No. 1 shaft bears 110 degrees about 300 feet from No. 2 shaft in the Outcast Mine. It was first sunk vertically for 19 feet on a rich pipe of tin ore, then 20 feet on a dip of 35 degrees north then 12 feet on a dip of 55 degrees north, then vertically for 13 feet, where it cut out in granite. It consisted of a seam of massive tourmaline very rich in tin associated with a great deal of fluor-spar.

A section of the shaft in the direction of the dip of the pipe would appear as shown.



No. 2 shaft bears about 45 degrees, 92 feet from No. 1. It is 30 feet deep, and at a depth of 26 feet has been driven south for 10 feet on a small vein of massive tourmaline full of tin and fluor-spar. At the time of my inspection most of the ore had been worked out, but a seam about 2 inches wide still showed under foot, carrying about 30 per cent. tin. It was so manifestly rich that samples were unnecessary, and has since been completely removed.

No. 3 (or the main shaft) was sunk about 80 feet north-east of No. 1 shaft to catch the pitch of the pipe of ore, but was a useless expense, as the pipe turned down vertically and cut out as shown in the above sketch.

The continuation of the large quartz-tourmaline outcrop on the south boundary of the Outcast lease has been tested in several places on P.M.L. 110 by shafts and trenches, and one very rich pipe of tin ore was found, but, like all the others, did not continue down, and no payable ore was being obtained at any part of this mine when I left the field.

The Perseverance Mine.

P.M.L. 83, Parish Warri, County Bourke. 13 acres 2 roods 18 perches.
Samples, 191-198. (See drawing No. 17.)

This lease adjoins the Commonwealth P.M.L. 66 on the south and has been opened by two shafts and some trenches, as shown in the locality sketch.

No. 1 shaft was sunk on a joint in the granite against which greisenization and tourmalinization had taken place, forming an irregular body of more or less tin-bearing stone, the most defined portion of which occurred above the drive, which is 17 feet below the surface and runs for 9 feet north. Underneath this the stone becomes more granitic (see sketch). Only one sample (193) gave payable results, assaying 2.87 per cent. tin, and this was evidently an enriched patch.

At No. 2 shaft some very rich "slugs" or "spuds" of tinstone were found in the loam, in a crevice in the granite. The shaft was afterwards sunk to prove if they persisted in depth into the solid rock, but they appear to be merely a collection of floaters and not likely to do so.

The owners have bagged sixty or seventy bags of the ore and loam, but a large proportion of it is very poor, and it will probably have to be re-sorted before it will be marketable.

"Ruby" tin was constantly being spoken of on the field, especially on this mine, but I was unable to discover any. I found subsequently that it is the local term for crystallised tinstone.

No quantity of payable ore can be estimated as obtainable from this mine.

The Kia-Ora Mine.

P.M.L. 46, Parish Warri, County Bourke. 9 acres 0 roods 35 perches.
Sample, 199. (See drawing No. 17.)

Adjoins the Perseverance on the east. One shaft and a number of trenches have been opened on this lease. The shaft is sunk on a lens of quartz-tourmaline rock in granite. It cuts out 18 feet below the surface, but some small bunches were found beneath it (see sketch). The sample was unpayable.

The junction of the granite and schist cuts through this lease, and the contact has been tested by several trenches, but no payable ore was found.

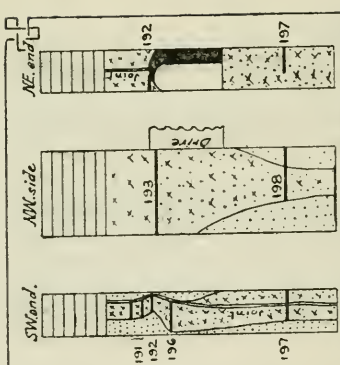
The Austral Lease.

P.M.L. 80, Parish Warri, County Bourke. 14 acres 1 rood 37 perches.
Samples, 200-204. (See drawing No. 17.)

This lease is situated on a steep fall on the north slope of Taylor's Hill, and has been prospected by a shaft and six trenches.

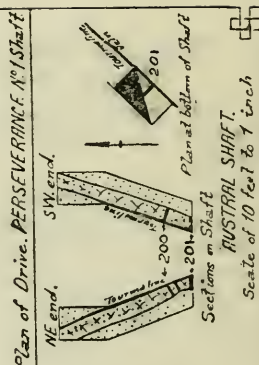
The shaft is 13 feet deep, sunk on a tourmaline vein in greisen flanked by granite.

This is the usual typical alteration on a joint in granite, and will probably be characteristically limited in extent. The ore is very dirty, carrying bismuth, wolfram, arsenical and copper pyrites and other impurities, and will, therefore, be difficult to concentrate to a marketable product. The joint strikes 45 degrees, dips north-west 70 degrees, and has been traced by a trench for a few feet.



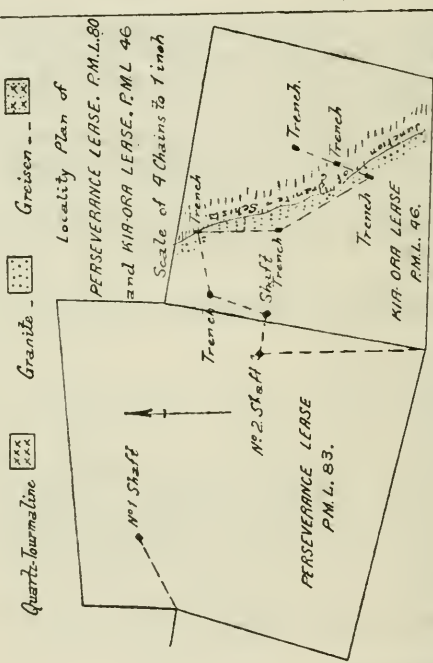
Sections on PERSEVERANCE N°1 Shaft

Scale of 10 feet to 1 inch.

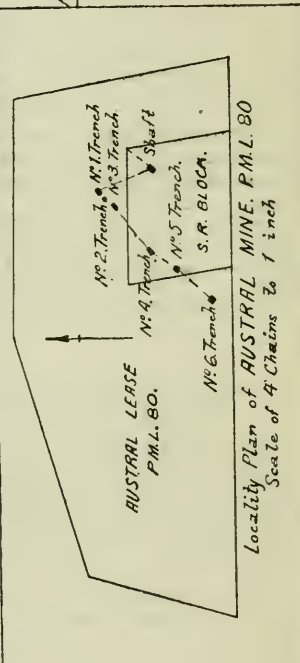


Plan of Drive, PERSEVERANCE N°1 Shaft

Scale of 10 feet to 1 inch



PERSEVERANCE, KIA-ORA, and AUSTRAL MINES.
P.M.L.'s 83, 96 and 80. Parish Warri, County Bourke

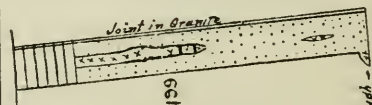


Locality Plan of AUSTRAL MINE P.M.L. 80

(21)

| Number of Sample | Locality | Assay of the sample |
|------------------|--------------------|---------------------|
| 191 | PERSEVERANCE | Trace |
| 192 | N°1 Shaft | 2.87 |
| 193 | " | Trace |
| 194 | " | " |
| 195 | " | " |
| 196 | " | " |
| 197 | " | " |
| 198 | " | " |
| 199 | KIA-ORA | Trace |
| 200 | SHAFT AUSTRAL | 0.79 |
| 201 | " | 1.83 |
| 202 | N°1, 2, 3 Trenches | Trace |
| 203 | " | " |
| 204 | N°4, 5 Trench | " |
| 205 | N°6 Trench | " |

Sample 199 Com. Mine 1.35% MoS₂
 " 200 " 0.59% Cu + 0.02% Bi
 " 201 " 0.77% " + 0.005% -



Vugh - at
Section on SSE end of KIA-ORA Shaft
Scale of 10 feet to 1 inch

Trenches 1 to 6 are opened on another parallel joint in granite, striking approximately south-west, and shows the usual alteration to quartz-tourmaline rock. It has been traced for about 400 feet. None of the samples gave payable assays, and the best result from the shaft gave 1.83 per cent. tin. It is unlikely that any quantity of payable ore will be obtained from here.

The Currajong Lease.

P.M.L. 76, Parish Warri, County Bourke. 11 acres 2 roods 32 perches.
No samples taken.

The owner, Mr. J. Blundon, objected to my taking samples of this mine, this being the only lease outside some of the companies mines where such a refusal was given.

An open-cut had been put down on a flat joint, striking more or less north, dipping east about 30 degrees in a wide belt of greisen, and situated some 400 yards west of the Austral workings.

On the surface some very rich tin ore was obtained, treated, and sold, and on the joint coarse crystals of tin oxide were plainly visible, but appeared to be faced on the rock and not penetrating it to any depth.

An option was afterwards granted to a local syndicate, who offered me every facility to examine the property and gave me the fullest information, confirming my opinion that the tin existed mainly as a facing on the joint.

Trenches were put down to test the greisen in other places near by, but the results were disappointing.

This body of greisen seems to be a continuation of the quartz-tourmaline outcrop on the south boundary of the Outcast Mine as already referred to. The future of this mine can only be foretold after further developments, but the ore will probably be limited.

Black and White Mine.

P.M.Ls. 53, 54, 55, 56, Parish of Warri, County of Bourke. Total acreage, 125 acres 3 roods 2 perches. Samples, 205-260. (See drawings Nos. 18 and 19.)

These leases occupy a large area of Taylor's Hill, including the main eastern peak, and the south-east and southern slopes below it.

Taylor's Hill is composed of the typical pink and white tourmaline-biotite-granite characteristic of the field, and has been prospected by means of trenches, shafts, and open-cuts on blocks 54, 55, and 56. A little work has been done on the northern slope of block 53, but nothing of any value seems to have been discovered.

No. 1 shaft on the extreme western end of P.M.L. 56 is 29 feet deep, sunk vertically in a body of decomposed white kaolinized granite, and driven from the bottom for 19 feet south-east and 41 ft. 9 in. north-west, as shown in the sketch. The shaft is on a flat at the bottom of the steep southern slope of the hill, and the decomposition would seem to have been due to this flat being the main drainage basin of this portion of the mountain.

The granite is traversed by a network of small tourmaline veins, and the tin occurs here in small well-defined crystals.

A series of greisen veins cross the drives at irregular intervals, striking about east-north-east, 4 to 6 inches wide, and are probably alteration products on original joints in the granite which, owing to their more siliceous

nature, have subsequently resisted decomposition, but reverse the usual conditions, as in this case the granite carries the tin and the greisen veins are barren. It is possible that the tin has been a primary constituent of the rock in this deposit.

The greisen veins have been faulted by a horizontal thrust, as evidenced by their displacement near the bottom of the drives on a seam of kaolin 2 inches thick, showing a movement of 12 to 16 inches.

I was informed that the whole of this shaft and 10 feet of the drives on each side of it carried values of over 1 per cent. tin, and, recognising the importance of so large a deposit (if this were true), since it could be very cheaply mined and treated owing to its softness and the clean nature of the tin, I sampled it exhaustively.

The whole of the shaft was therefore tested by means of diagonal cuts on each side and end from top to bottom, and the drives by horizontal cuts on both sides, 5 feet in length in the reputedly richer portions and 10 feet in the poorer portions.

Unfortunately, none of the samples gave payable results. Careful dish prospects showed no values above 0.25 per cent. tin, and the official assays only returned a trace of tin.

No. 1 trench near the above shaft was not sampled, as the tin had all been mined. It occurred in a greisen lying on top of the primary granite and did not go down.

No. 2 trench, a chain further north, consists of a body of quartz-tourmaline rock and greisen merging into granite, and is probably a local alteration. Both the samples taken here were unpayable.

No. 3 trench, near the north-east corner of P.M.L. 108, is 8 feet deep, sunk on an irregular body of quartz-tourmaline rock, with masses of tourmaline and chlorite in the centre. It has no definite shape or strike, and is completely surrounded by granite, and is, in fact, a small pipe shaped like an inverted cone and cut off on one side by a head striking 245 degrees. A very small area in the centre carried visibly rich tin, but the sample which was taken round and avoided this, only gave a trace. The tonnage of payable ore likely to be obtained from here is insignificant.

No. 4 trench or open-cut (see drawing No. 19), near No. 3 trench, has been driven north for 58 feet into the side of the mountain, and a large quantity of stone mined and picked, and a few tons bagged and sent away. The granite has been fractured by a number of joints and heads, resulting in the tourmalinization and greisenization of the rock forming an irregular body of quartz-tourmaline and greisen merging from one into the other, with seams of pure tourmaline and chlorite in places.

The peculiar nature of this occurrence is indicated in the sketch. It was as closely sampled as was possible in so large and awkward a body, but only one sample (233) gave payable results, *i.e.*, 2.84 per cent. tin.

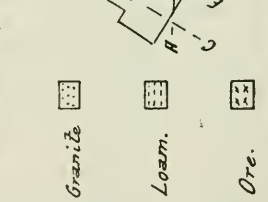
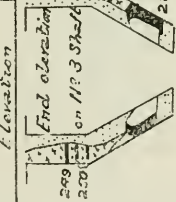
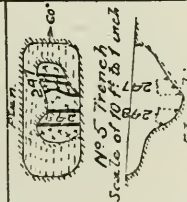
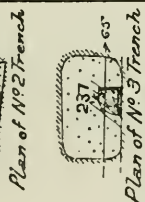
It is evident that the tin occurs in bunches and patches, and as a large quantity of stone would have to be mined and picked over for a very small quantity of ore, it is unlikely that it will pay to work on a large scale.

Samples 236 and 237 were taken across the bottom of the open-cut near the mouth, where a seam of tinstone was visible in a layer of white fine-grained granite. The samples were not payable.

(18)

| Number of Sample | Locality | Assay of TON Per cent |
|------------------|------------|-----------------------|
| 205 | No 1 Shaft | Trace |
| 206 | " | " |
| 207 | " | " |
| 208 | " | " |
| 209 | " | " |
| 210 | " | " |
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| 299 | " | " |
| 300 | " | " |

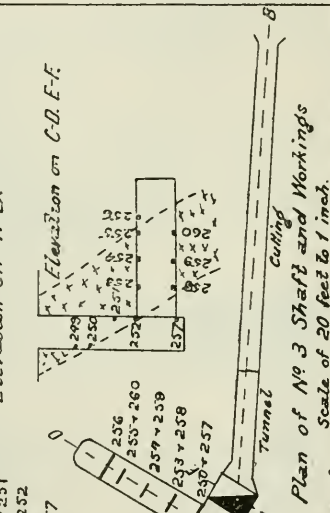
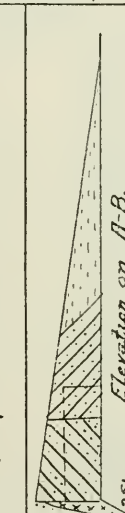
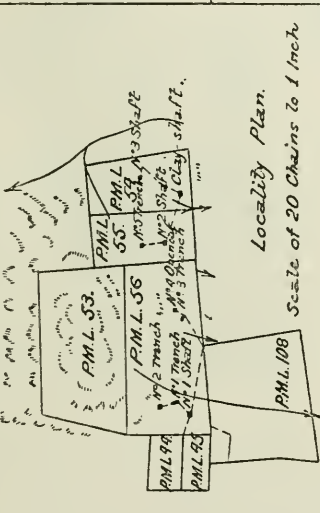
Scale of 10' to 1 in.
Plan of No 2 Trench



Granite
Loam
Ore.

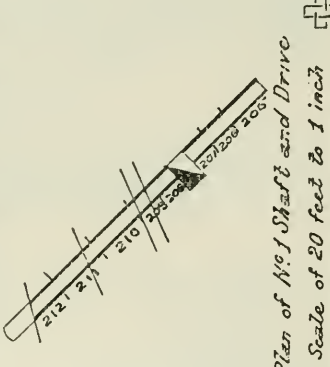
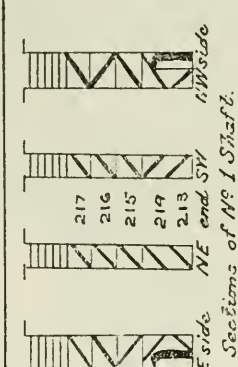
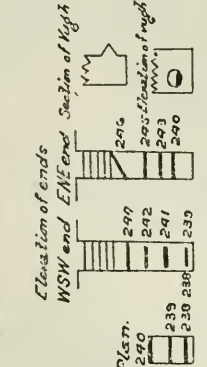
BLACK and WHITE MINE

P.M.L. 53, 54, 55, 56 Parish of WARRI. County DUNDEE



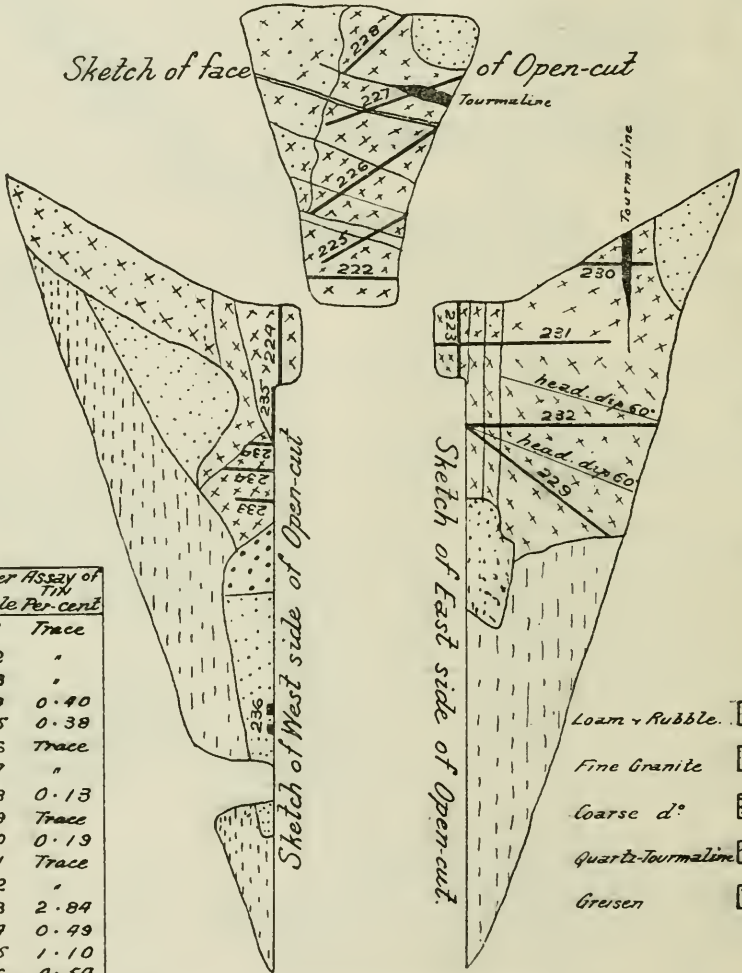
Plan of No 3 Shaft and Workings
Scale of 20 feet to 1 inch.

Sections of No 2 Shaft
Scale of 20 feet to 1 inch



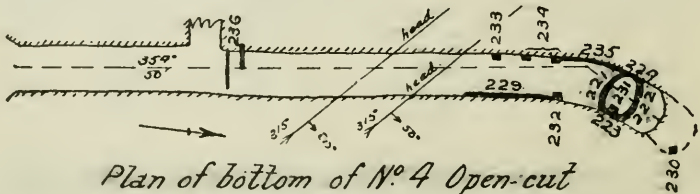
BLACK and WHITE MINE
 Parish of WARRI, County of BOURKE
 N° 4 OPEN-CUT. P.M.L. 56.

Sketch of face of Open-cut



| Number Assay of | Sample Per-cent |
|-----------------|-----------------|
| 221 | Trace |
| 222 | " |
| 223 | " |
| 224 | 0.40 |
| 225 | 0.38 |
| 226 | Trace |
| 227 | " |
| 228 | 0.13 |
| 229 | Trace |
| 230 | 0.19 |
| 231 | Trace |
| 232 | " |
| 233 | 2.84 |
| 234 | 0.49 |
| 235 | 1.10 |
| 236 | 0.54 |

Sketch showing positions of samples



No. 2 shaft and No. 5 trench have been sunk in a well-defined and wide belt of greisen, striking more or less north and south in P.M.L. 55. This belt can be traced for several hundred feet and shows distinct shear planes running north and south and dipping east, with considerable downward movement on the hanging wall side of each fault.

In my opinion this is the most important and promising site on the property and should be extensively prospected. None of the samples gave payable results, and no doubt the tin will be found in bunches of limited size, but there is every possibility of finding payable pockets along the prominent shear planes.

Near the bottom of No. 2 shaft a vugh was found in white quartz. It was 2 ft. 9 in. wide, 2 ft. 6 in. high, and 2 feet deep, and carried some rich tinstone bedded in crystals of quartz.

The "clay" shaft in P.M.L. 54 is 16 feet deep, sunk on a clay channel in the granite. Some slugs of tinstone were found as floaters in the clay, but no lode exists here, and the place was not of sufficient importance or extent to justify sampling.

No. 3 shaft in P.M.L. 54 is sunk for a depth of 30 feet and driven 25 feet north on a formation situated on a spur at the extreme east end of the main range, and connected to an open trench and tunnel 12 feet below the surface level of the shaft. The open trench bears west and is 60 feet long. The tunnel is formed by decking over the deeper portion of the trench and covering it with ballast of reputedly 2 per cent. tin ore.

The pink granite showing in the tunnel has been split by a vertical joint, on either side of which a series of joints have formed, resembling the anticlines in sedimentary rock, this similarity being purely a coincidence. (See drawing No. 18.)

The vein which the shaft and drive have followed strikes 30 degrees and dips north-west 60 degrees and is a clay, rubble, and greisen formation between two walls. In the south end of the shaft this vein started from the surface and came down nearly to the level of the drive, where it wedged out; in the north end of the shaft it went deeper, showing just below the floor of the drive, but the bottom of the shaft is in granite. The tin-bearing portion can be traced along the drive for about 20 feet, after which it becomes barren. It seems evident, therefore, that the ore shoot has a northerly pitch, as shown in the sketch section on CD and EF, and that a continuation of the shoot will be found under the drive in a corresponding section.

The position of this shoot was constructed in the sketch from the samples taken here, and a considerable quantity of low-grade but payable ore may be found if the shoot is followed down, results varying from 0.35 to 2.42 being obtained in the samples.

No other work of any magnitude has been done on the property, but at least two wide and well-defined belts of quartz-tourmaline rock, similar to those on the Outeast and Commonwealth, can be seen striking a little west of north, and some attention should be devoted to these, as pockets of good ore might be located in them.

It is as impossible to form any reliable estimates of payable tonnage of ore from this mine as in any of the others on the field, but as an approximation of possible ore in "sight" the following figures are given:—

| | | | | | | |
|--------------------------------------|-----|-----|---------|------|-------|--------------------|
| At No. 4 open-cut | ... | ... | 10 tons | ... | of 3 | per cent. ore. |
| At No. 2 shaft and No. 5 trench | 5 | ,, | ... | of 2 | ,, | ,, |
| At No. 3 shaft | ... | ... | 45 | ,, | of 1½ | ,, |
| At No. 3 shaft | ... | ... | 2 | ,, | of 3½ | ,, |
| At No. 3 shaft, ore <i>in situ</i> . | ... | ... | 30 | ,, | of 2½ | ,, |
| | | | — | | | |
| Total | .. | ... | 92 tons | ... | of 2 | per cent. tin ore. |

The dumps at No. 4 open-cut aggregate about 150 tons, estimated by the owners at from 1.5 to 2 per cent. tin, but in my opinion not more than 10 tons of this would pay to crush after careful picking.

Messrs. Williatt and Party's Mine.

Authority to Enter 1,159, Parish Warri, County Bourke. 33 acres 2 roods 25 perches. No samples taken.

The workings here consist of one shaft 27 feet deep and several trenches on a quartz-tourmaline and greisen outcrop bearing 152 degrees about 500 feet from the north-east corner of P.M.L. 108.

On my arrival at Ardlethan some very rich ore was being won from the shaft, but finally wedged out on a bar of granite which came in from the south and cut it out on a head in the north end of the shaft. Some of the trenches showed good tin on the surface, but it did not go down. When I inspected the mine to sample it, the owners admitted that it carried no payable values, which my examination confirmed. They subsequently disposed of their interest to Messrs. Perse and party, who are now prospecting the lease for other pipes.

McCrae's Lease.

P.M.L. 65, Parish Warri, County Bourke. 18 acres 3 roods 37 perches. Not sampled.

This lease lies immediately north of P.M.Ls. 54 and 55. A shaft has been sunk for 15 feet on a vein of tourmaline in a wide belt of quartz-tourmaline rock and greisen, traceable for some distance, and trenched and pot-holed in several places. No work was in progress here during the whole of my stay at Ardlethan, though I understand that the block has not been abandoned.

It was not sampled, as the nature of the work and idleness of the mine indicated that the results obtained had not been profitable.

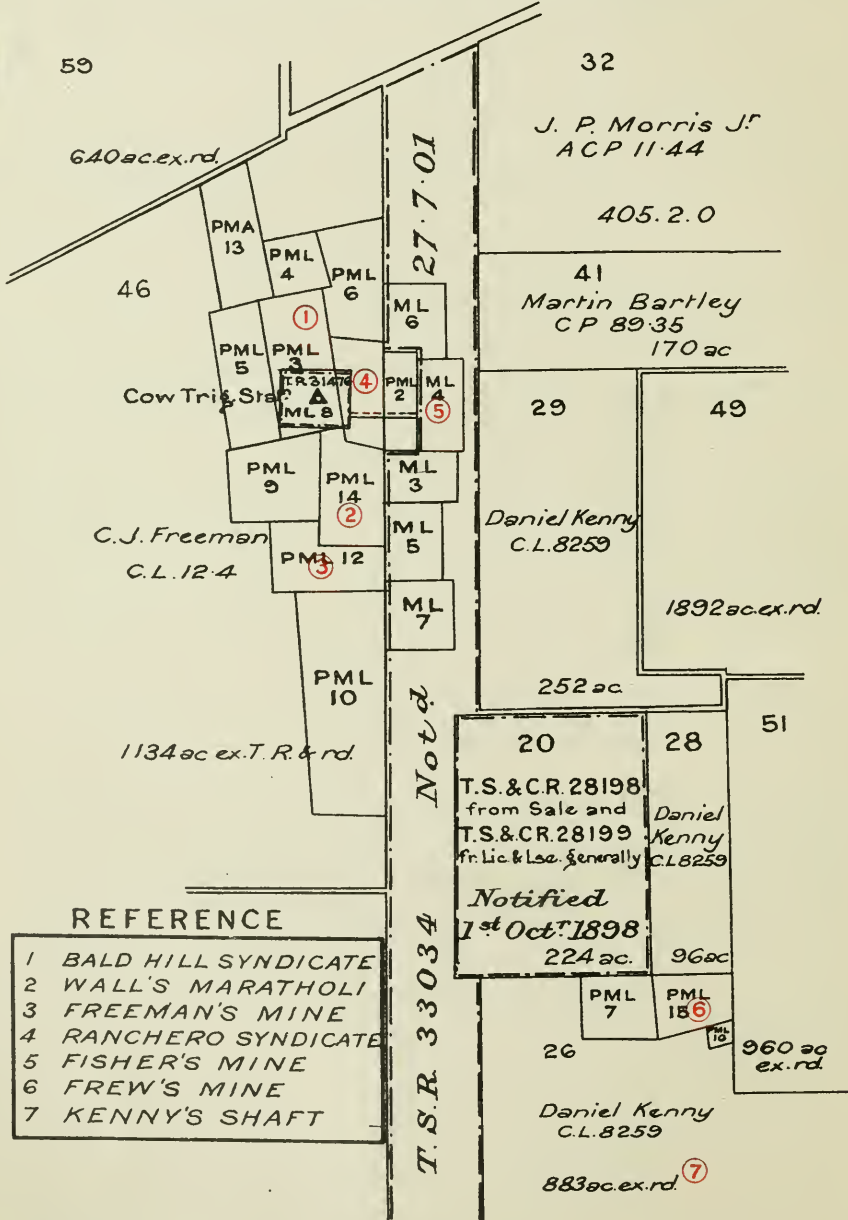
ARDLETHAN TIN FIELD BALD HILL GROUP OF MINES.

Diagram showing localities
of the leases referred to:—

Scale

CHAINS 0 20 40 60 80 CHAINS

M. N



REFERENCE

- | | |
|---|---------------------|
| 1 | BALD HILL SYNDICATE |
| 2 | WALL'S MARATHOLI |
| 3 | FREEMAN'S MINE |
| 4 | RANCHERO SYNDICATE |
| 5 | FISHER'S MINE |
| 6 | FREW'S MINE |
| 7 | KENNY'S SHAFT |

IV.—BALD HILL GROUP.

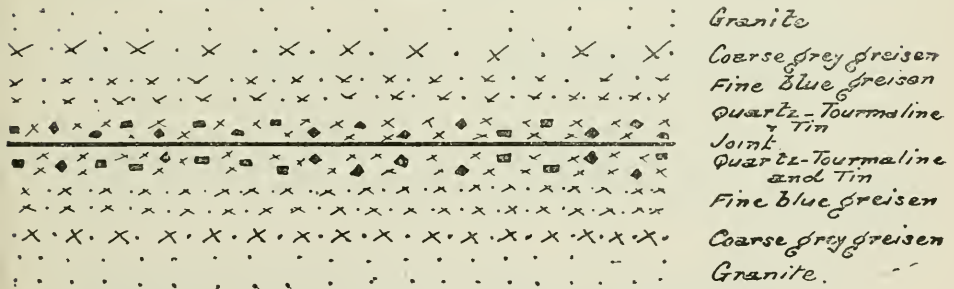
Bald Hill Syndicate.

P.M.L. 3, Parish Walleroobie, County Bourke. 21 acres 3 roods 24 perches. Samples, 356-379. (See drawing No. 20.)

Bald Hill is an isolated biotite granite knob of a pinkish-white colour, with coarse felspar crystals, surrounded by undulating arable land, and situated about 8 miles due south from the Wild Cherry Mine. The main trend of the hill is north-north-west, and Gow trigonometrical station is built on the summit.

It is traversed by innumerable more or less parallel joints, and the usual alteration has occurred along these, resulting in tourmalinization and greisenization of the granite in their vicinity. The tin occurs in these joints and in the greisen on either side.

Where two of these joints are close together the alteration has extended through from one to the other, forming a fair-sized belt of greisen, otherwise it is usually very small. The tin occurs in patches in these bands of greisen. The joint faces are either black or brown, according to whether iron or tourmaline predominates. Immediately outside this comes a narrow belt of quartz-tourmaline rock about $\frac{1}{4}$ inch wide, carrying most of the tin. This merges into a fine-grained blue greisen, then into a coarse grey greisen, both carrying tin in diminishing quantities, and finally passing into unaltered primary granite, as illustrated in the accompanying sketch.



The total width from granite to granite varies from 2 up to 16 inches, seldom more.

Innumerable trenches and potholes have been sunk all over the lease wherever brown joints are showing in the granite, but the system of prospecting adopted has been to follow four main joints, which are known respectively as the Great Western, Central Western, Great Central, and Great Eastern "Lodes."

No. 1 shaft is the only place calling for comment on the Great Western line. It is 15 feet deep, sunk on a narrow vein of rich tinstone varying from 2 to 6 inches in width in a belt of quartz-tourmaline rock about 4 feet wide, and greisen. The seam of tinstone was sampled separately from the greisen on either side of it.

Sample 358 from the former assayed 18.96 per cent. tin and sample 359 from the latter 1.80 per cent. tin. A honeycombed leader on the west wall, included in the last sample, carries tin, wolfram, and mispickel. A cross course traverses the shaft from the south-east to the north-west corner.

The seam of tinstone is still going down underfoot, and a fair amount of ore should be obtainable from here. All the other samples on this line were unpayable.

Five trenches were sampled on the "Central Western" line, and none of the samples gave payable results. This so-called line is really a series of closely parallel joints, and some of the trenches have cut through two or three of them, in which case they were all included in the sample.

Two trenches opened on the "Great Central" line were sampled, but the results were also unpayable. No. 10 trench carried some very rich tin in and just under the loam, where a series of transverse joints and heads had caused greisenization for some width, but the enrichment appears to have been superficial.

This line and the previous one junction about 300 feet south of Nos. 9 and 11 trenches, and continue as a well-defined greisen outcrop, but it was not sampled and no payable tin had been found here.

The "Great Eastern" lode, like the others, is not really one continuous line, but a series of closely parallel joints which have been opened, sometimes on one and sometimes on another, and some of the trenches cross several of them.

No. 1 open-cut is a trench 8 feet deep, 8 feet wide, and 28 feet long, sunk on two main joints with greisen on either side, merging into granite. These joints cut through flat floors, on which the altered rock opens out and appears wider than it really is. The samples were not payable, and very little pay ore is likely to be obtained here.

No. 2 open-cut is on a coarse spotted biotite-granite, traversed by innumerable heads and breaks, causing impregnation in their neighbourhood. This alteration is purely local, and the sample taken here gave unpayable results. Both copper pyrites and zinc sulphide are visible in the stone.

Trenches 13 and 14 were the only ones on this "line" which gave payable results, the combined sample (372) from here assaying 2.62 per cent. tin. They are two parallel joints in hard granite, 12 inches and 8 inches wide respectively, and serve as an excellent illustration of the manner in which the tin occurs.

From No. 15 trench to No. 3 open-cut a prominent outcrop of greisen and quartz-tourmaline rock can be traced, and No. 2 shaft was sunk for 23 feet on a well-defined joint carrying wolfram. Good tin values are said to have been obtained near the surface, but my samples, which were taken only where rich tin was stated to occur, gave unpayable results, and the sinking here is extremely hard and expensive. None of the other places call for comment.

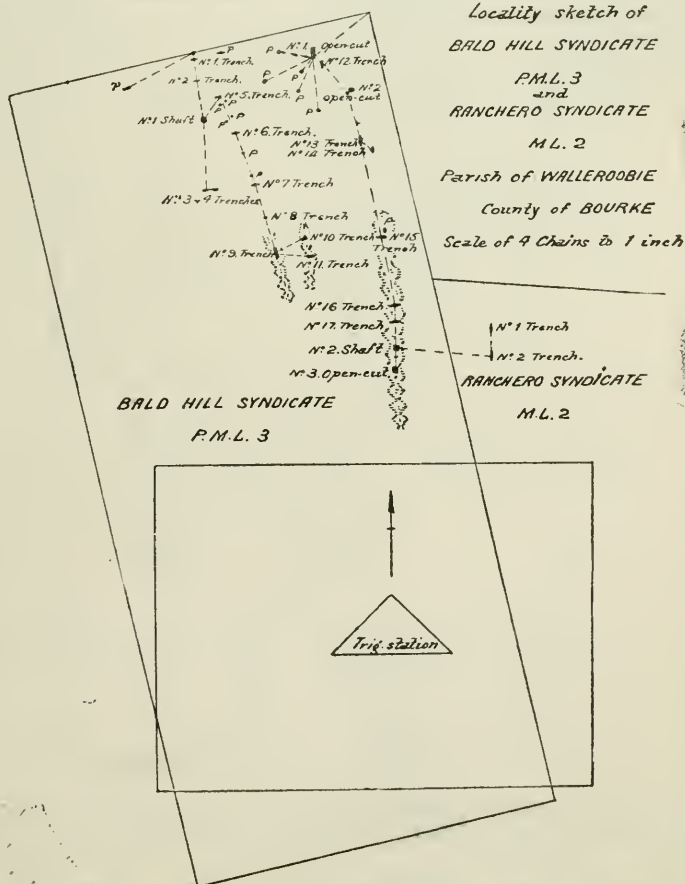
Numerous potholes and trenches have been put down on other joints as indicated by the "P" in sketch No. 20. Any of these joints may carry patches of tin ore, but in my opinion they will be small and local, and I saw no evidences of any large or permanent pipe.

A wide and prominent outcrop of quartz-tourmaline rock is showing near the Trigonometrical Survey Station, and forms the south-east spur of the hill, being traceable as a prominent ridge down to the arable flats, where it disappears. It has been napped and tested here and there, but evidently without success. It resembles similar outcrops described on the Outcast and Commonwealth leases.

It is possible that 200 tons of payable ore can be obtained from the Bald Hill Syndicate's Mine.

BALD HILL SYNDICATE, P.M.L.3; and RANCHERO SYNDICATE, M.L.2.
Parish of WALLEROOBIE, County of BOURKE.

| | Number of Sample | Locality | Assay of $\frac{\text{FIN}}{\text{per-cent}}$ | (20) |
|---|---------------------------------------|-----------------------------------|---|--|
| Samples 358-362 contain traces of Arsenic & Wolfram | 356 | BALD HILL SYNDICATE N°1 Trench | Trace | Many of the other samples contain Cu:WO ₃ and other impurities. |
| | 357 | N°2 " | 0.13 | |
| | 358 | N°1 Shaft | 18.96 | |
| | 359 | " | 1.80 | |
| | 360 | N°3-4 Trenches | 0.10 | |
| | 362 | N°5 Trench | 0.10 | |
| | 363 | N°6 " | 1.09 | |
| | 364 | N°7 " | 0.39 | |
| | 365 | N°8 " | 0.20 | |
| | 365 | N°9 " | Trace | |
| | 366 | N°10 " | 0.27 | |
| | 367 | N°11 " | Trace | |
| | 368 | N°1 Open-cut | 0.30 | |
| | 369 | " | 0.17 | |
| | 370 | N°12 Trench | 0.10 | |
| | 371 | N°2 Open-cut | 0.09 | |
| | Trenches marked "P" were not sampled. | 372 | N°13 & 14 Trenches |  | 2.62 |
| 373 | | N°15 Trench | 0.27 | |
| 374 | | N°16 " | 0.31 | |
| 375 | | N°17 " | 0.34 | |
| 376 | | N°2 Shaft | 0.34 | |
| 377 | | " | 0.31 | |
| 378 | | RANCHERO SYNDICATE N°1 Trench | 0.71 | |
| 379 | | N°2 " | Trace | |



The Rancho Syndicate.

M.L. 2, Parish Wallerobie, County Bourke. 20 acres. Samples, 378-379.
(See drawing No. 20.)

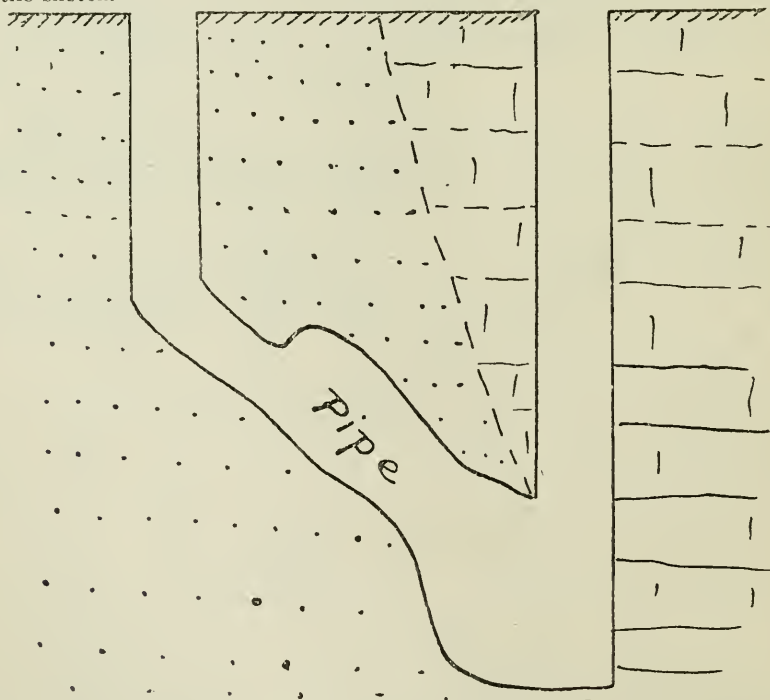
This lease lies immediately east of the Bald Hill Syndicate, and shows the same characteristic series of joints. One fairly defined outcrop extends north and south for several chains, and samples were taken in two trenches where the solid stone was exposed. Neither of these were payable.

An open-cut had been put down for about 10 feet on another outcrop further south, where molybdenite was distributed through the stone, but the quantity of this mineral present was not sufficient to be payable.

The owners admitted that no other places on the lease were worth sampling.

A considerable amount of work has been done by Messrs. Fisher and party on P.M.L. 2, where a series of holes have been sunk on a number of joints and heads in granite. Most of these were evidently short shoots and bunches, which have been completely taken out, and from information received I considered that it was useless to sample them.

Two shafts have been sunk on M.L. 4 on the contact of the granite and schists, where a small pipe of ore was found. It started in granite and pitched south on to the contact between the two classes of rock, as shown in the sketch.



The slate carries no values, and the granite shaft was so evidently sunk on a pipe in which all the ore had been mined that it was useless to sample it.

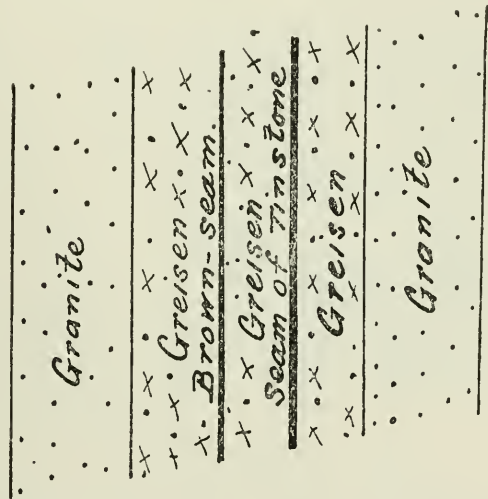
Neither of these two leases was being worked.

W. C. Wall's Maratholi Mine.

P.M.L. 14, Parish of Walleroobie, County Bourke. Samples, 380 to 391.
(See drawing No. 21.)

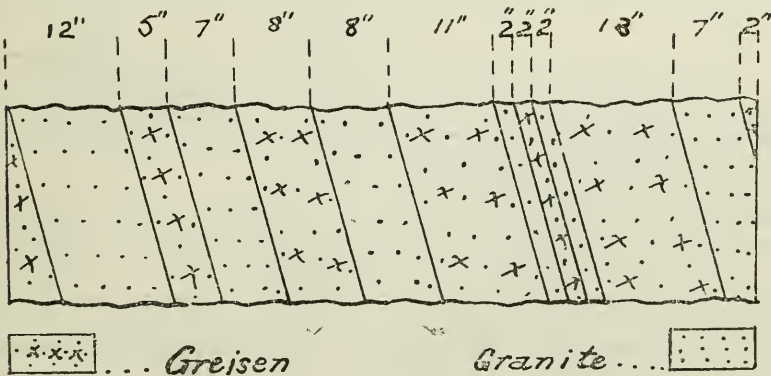
This lease is in a cultivation paddock at the foot of the south end of the Bald Hill. Four trenches and two shafts have been sunk on a belt of greisenized granite, proved by No. 1 trench to be at least 43 feet wide, in which alternate bands of granite and greisen occur with great regularity, varying in width from 1 inch to 3 feet. Their average strike is 10 degrees, and the dip varies from 75 degrees to 85 degrees west. These greisen bands are traversed by joints with a similar strike and dip which were probably the original causes of the greisenization, the alteration having taken place along them in a similar manner to that described at the Bald Hill Syndicate lease, but at Wall's lease they are so much closer together as to form a wide and almost continuous belt of greisen.

Sometimes these small joints and heads are represented by mere brown streaks, at others they open out to one sixteenth or $\frac{1}{4}$ -inch wide, and are then often filled with solid seams of tinstone, but the greisen on either side is side is usually barren. This occurrence of the tin is very characteristic of Wall's Mine, and some of the specimens obtainable here are very interesting and instructive. Unfortunately, the seams of tin are not close enough together or large enough in proportion to the enclosing greisen to make the whole belt payable.



A sketch of one of these greisen bands would appear somewhat as shown—

An actual section of No. 1 shaft where sample 384 was taken shows the alternation of granite and greisen as follows:—



No. 1 trench is about 60 feet north of No. 1 shaft. It is 10 feet deep and 43 feet long, neglecting the shallow loam trench at either end. It runs east and west and carries the typical alternating bands of granite and greisen, but the most easterly 10-foot section sampled was composed almost entirely of greisen owing to the joints being more numerous and closer together. East of this the trench passed into decomposed, friable, and barren granite.

No. 1 shaft is sunk vertically for 42 feet in the same belt as No. 1 trench. In the bottom portion the greisen is more continuous, and the granite bands narrower than near the top. This is due to the westerly dip bringing the more solid stone showing in the east end of the trench into the shaft.

Assays of samples from No. 1 trench ranged from a trace to 0.77 per cent. tin and from No. 1 shaft from 0.24 per cent. to 0.39 per cent. tin.

No. 2 shaft is 16 ft. 9 in. deep, sunk on a band of greisen, striking 10 degrees and dipping west 75 degrees, being one of the many similar bands. It would pass into No. 1 shaft at depth, but on the surface runs east of it. The best assay from here was 1.59 per cent.

Nos. 2 and 4 trenches were not sampled, as the former was stated to be unpayable, and the latter was only just opened in the loam.

No. 3 trench was 7 feet deep, 2 ft. 6 in. wide, and 11 ft. 6 in. long. Most of it was in loam and had only been sunk deep enough to expose the rock at one place in the bottom. The bands of greisen strike 65 degrees, dip west 78 degrees, and therefore differ from all the others, but this is probably due to surface disturbance. Only one sample was taken across two bands, and assayed 0.48 per cent. tin.

A little ore can be obtained in this mine by picking out the stone carrying the tin-bearing seams, but so far the mine is unpayable, taken as a whole. Owing to the width of the formation it is well worthy of further prospecting, preferably by sinking the No. 1 shaft, and then cross-cutting for the full width of the zone of altered rock to prove it at depth.

Only about 10 tons of payable stone were obtainable at the time of my inspection.

Freeman's Lease.

P.M.L. 12, Parish Walleroobie, County Bourke. Samples, 392-393. (See drawing No. 21.)

This lease adjoins Wall's on the south, and embraces the same greisen belt. It has been prospected by means of four trenches and one shaft. The owners stated that No. 1 trench was the only one worth sampling, and samples from here only gave traces of tin.

No payable ore has been discovered so far on this mine.

Frew's Mine.

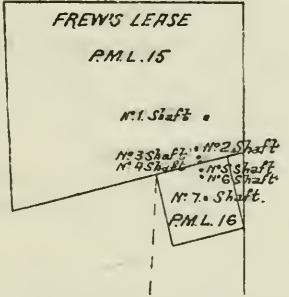
P.M.Ls. 15 and 16, Parish of Walleroobie, County of Bourke. 21 acres 0 roods 10 perches. Samples, 398-404. (See drawing No. 21.)

These leases are situated on the western slope of a hill about a mile and a half south-south-easterly from Bald Hill, and near a tank on travelling stock and camping reserves 28,198 and 28,199.

A series of shafts and trenches has been put down on a tin-bearing belt of schist close to its junction with granite. The ore occurs in pipes and bunches in ironstone and schist heavily impregnated with iron oxide.

No. 3 is the deepest shaft and followed a pipe of tin for a depth of 47 feet. The vein strikes 340 degrees, dips west 73 degrees, and the pipe pitches south 75 degrees. The bottom of the shaft seems to be close to the contact with the granite. All the ore in the north end has been taken out, but some remains in the south end, where it shows about 2 ft. 6 in. wide.

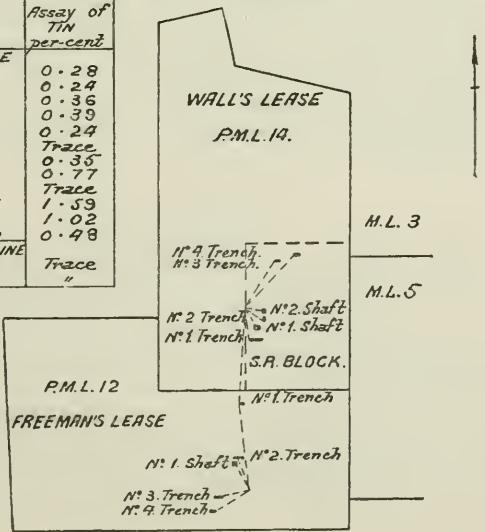
Locality sketch of
FREW'S LEASES
 P.M.L.'s 15 & 16
 and
 KENNY'S abandoned SHAFT
 Parish of WALLEROOBIE
 County of BOURKE
 Scale of 8 Chains to 1 inch



| Number of Sample | Locality | Assay of TIN per-cent |
|------------------|--------------------------|-----------------------|
| 394 | KENNY'S SHAFT Drive | Trace |
| 395 | " " | " |
| 396 | " " | " |
| 397 | Bottom of Shaft | " |
| 398 | FREW'S LEASES N° 3 Shaft | Trace |
| 399 | " " | 0.11 |
| 400 | " " | 0.28 |
| 401 | " " | 0.55 |
| 402 | N° 4 Shaft | 0.64 |
| 403 | N° 2 Shaft | 0.23 |
| 404 | N° 1 Shaft | Trace |

Locality sketch of
 WALL'S "MARATHOLE" LEASE, P.M.L. 14; and FREEMAN'S LEASE, P.M.L. 12.
 Parish of WALLEROOBIE. County of BOURKE.
 Scale of 8 Chains to 1 inch

| Number of Sample | Locality | Assay of TIN per-cent |
|------------------|----------------------------|-----------------------|
| 380 | WALL'S LEASE N° 1. Shaft | 0.28 |
| 381 | " " | 0.24 |
| 382 | " " | 0.36 |
| 383 | " " | 0.39 |
| 384 | " " | 0.24 |
| 385 | N° 1. Trench | Trace |
| 386 | " " | 0.35 |
| 387 | " " | 0.77 |
| 388 | " " | Trace |
| 389 | N° 2. Shaft | 1.59 |
| 390 | " " | 1.02 |
| 391 | N° 3. Trench | 0.48 |
| 392 | FREEMAN'S MINE N° 1 Trench | Trace |
| 393 | " " | " |



The other places sampled were Nos. 1, 2, and 4 shafts, 11, 39, and 46 feet deep respectively, and all sunk on small pipes or shoots.

None of the samples gave payable results, though they were taken only where good values were said to exist.

No parcels of ore have been sent from here, and the heaps of picked stone lying on the surface are small, pointing to the fact that so far no important deposit has been located.

A number of trenches and pot-holes have been put down between each of the shafts, but evidently without success.

The line of contact of the schist and granite is a promising one for prospecting purposes, but so far nothing has been discovered likely to yield any quantity of payable ore.

This belt of schist can be traced from here to the Bald Hill, where it shows as V-shaped wedges entering the granite on the east side. It runs north and south, and probably connects with the range of sedimentary rock already described between Taylor's Hill and the Carpathia Hill, and on which the Southern Cross leases are situated.

Kenny's Abandoned Shaft.

Samples, 394-397. (See drawing No. 21.)

This shaft is about one-third of a mile south from Frew's workings, and has been sunk vertically for 32 feet in a large body of decomposed kaolinized white granite in a flat between two granite knobs. A cross-cut has been driven for 33 feet due west, 8 feet up from the bottom.

I was informed that the whole of the material in this shaft would assay 3 per cent. tin, so four samples were taken in the cross-cut and shaft, but none of them gave more than traces of tin. As a further check a number of prospects were dished off from samples taken all round the dump lying at the surface with equally disappointing results.

The decomposed rock is evidently the same as the hard granite surrounding it, as the feldspar, though converted to kaolin, still preserves its original shape, and the peculiar mottled appearance of the granite is visible in both cases. It is traversed by numerous veins of tourmaline, which probably carry the small amount of tin present.

The decomposition is probably due to the flat being a main drainage basin between the two hills, and resembles the white shaft (No. 1) on the Black and White Mine.

UNCLASSIFIED GROUP.

Matheson's Mine.

Portion No. 56. Authority to Enter, No. 1,261, Cootamundra, Parish of North Bolairo, County of Bourke. Samples, 405-411.

This is an abandoned lease, which has recently been taken up by Mr. Matheson and situated about 1 mile north of Mount Charles. It consists of one shaft and four trenches.

The shaft is 15 ft. 6 in. deep, sunk on a belt of greisen, striking east and west, traversed by a number of joints, striking 70 degrees and dipping south 45 degrees, which are intersected by others striking 135 degrees and dipping south 50 degrees, and others again which have no definite direction. This also appears to be a wide belt of granite altered to greisen in the vicinity of the joints.

None of my samples gave payable results, though a few pieces of good ore could be culled from the dump. Zinc-blende, copper pyrites, and other impurities were visible in the stone.

No. 1 trench was in the same greisen belt; the others were all in granite.

So far no quantity of payable ore has been obtained from this mine.

This completes the description of the various leases on the field which were sampled and examined by me. A great number of other leases taken up from time to time were abandoned as unpayable, or were held for speculation purposes only while the boom lasted, and are never likely to produce any ore.

SUMMARY.

The task of sampling such a number of leases and workings was a very onerous and difficult one, especially when the patchy nature of the occurrence of the tin is taken into consideration. Another series of samples might therefore give somewhat variable results from those already obtained, but wherever the owners of mines claimed that good ore existed close sampling was adopted, and the values obtained will probably average out very closely to those which would be got if the ore were treated in bulk.

The tin in nearly every case occurs as a secondary product in altered granite, and though these altered belts can often be traced for considerable distances, the ore itself usually seems to exist in pipes and bunches, the continuity of which cannot be depended upon.

Furthermore, the fact remains that the results obtained generally were disappointing, and in very few cases substantiated figures claimed for them, either in quantity or value.

This examination and report having been undertaken primarily to determine whether the petition for a State battery for Ardlethan is one which should be favourably considered, a rough estimate is given of payable ore likely to be obtained from those mines which do not possess their own plants; but this estimate must be considered merely as the widest approximation to the truth. Firstly, because the patchy nature of the tin renders a calculation of ore in "sight" a matter of great uncertainty, since a pipe might go down for some distance or cut out in a few feet. Secondly, because it was impossible to sample all the dumps of reputedly payable stone scattered throughout the field. In those cases where dump samples were obtained the results failed to confirm the values claimed for them. Thirdly, because from the very nature of the deposits it is probable that other rich pipes and pockets of ore will be found from time to time in different parts of the field.

I feel certain, however, that the amount of payable ore obtainable for a State battery will not be nearly so great as is generally believed.

Subject to the limitations mentioned above, I estimate that at the time of my inspection the total amount of ore available, which would pay to crush if a State battery were erected, is about 6,000 tons.

An up-to-date ten-head mill with the necessary accessory machinery would treat this in six months if working three shifts, or in eighteen months if working one shift.

My report on the battery and water site is given separately as an appendix, and deals fully with the whole question, including the advisableness of erecting such a plant, thus keeping the general report on the mines and field entirely distinct.

Full details and sketches of all the samples taken by me are included in my progress reports sent you from time to time. These are too bulky to be included here, but a tabulated statement is attached for quick reference.

Before closing this report I wish to place on record my appreciation of the assistance and information furnished to me by the mine-owners and managers of the various mines inspected; of Mr. G. Schwarze, who acted as my assistant, for the painstaking and reliable manner in which he performed his duties; and of Mr. W. Gullock, the manager of the White Crystal Tin Mining Company, who supplied me with a complete outfit of sampling tools.

Great credit is due to Mr. J. C. H. Mingay, F.I.C., F.C.S., and his staff, on whom fell the heavy work of assaying the 431 samples forwarded, not only for tin, but in many cases for lead, bismuth, wolfram, copper, arsenic, titanium, molybdenite, and other minerals and metals.

Mr. G. W. Card, A.R.S.M., the Curator of the Mining and Mineralogical Museum, furnished me with much valuable information, and cut, examined, and identified many rock sections.

APPENDIX.

RESULTS of assays made by Mr. J. C. H. Mingaye, F.I.C., F.C.G., and Staff in the Laboratory of the Department of Mines.

| Number of Sample. | Name of Mine and Locality. | Tin, per cent. | Tungstic Acid, per cent. |
|-------------------|----------------------------|----------------|--------------------------|
| Temora Syndicate— | | | |
| 1 | No. 1 trench | 0·52 | ..... |
| 2 | " | 0·05 | ..... |
| 3 | " | 0·10 | ..... |
| 4 | " | 0·00 | ..... |
| 5 | " | 0·00 | ..... |
| 6 | No. 2 " | 0·47 | ..... |
| 7 | No. 3 " | 0·72 | ..... |
| 8 | No. 4 " | 0·35 | ..... |
| Big Bygoo Mine— | | | |
| 9 | No. 1 trench | 0·10 | ..... |
| 10 | " | 0·05 | 0·10 |
| 11 | " | 0·18 | ..... |
| 12 | No. 1 shaft | 0·20 | 0·10 |
| 13 | " | 0·19 | ..... |
| 14 | " | 0·04 | ..... |
| 15 | No. 2 trench | 1·16 | 0·10 |
| 16 | No. 3 " | 1·11 | ..... |
| 17 | " | 0·07 | ..... |
| 18 | No. 4 " | 3·64 | ..... |
| 19 | " | 5·60 | ..... |
| 20 | No. 3 shaft | 6·64 | ..... |
| Lone Hand Mine— | | | |
| 21 | No. 2 shaft | 0·23 | ..... |
| 22 | " | 0·65 | 0·10 |
| 23 | " | 0·06 | ..... |
| 24 | " | 1·21 | ..... |
| 25 | " | 1·07 | 0·10 |
| 26 | " | 0·98 | ..... |
| 27 | " | 0·44 | 0·21 |
| 28 | " | 1·47 | ..... |
| 29 | " | 0·42 | ..... |
| 30 | " | 0·63 | ..... |
| 31 | " | 0·93 | 0·07 |
| 32 | No. 1 shaft | 0·07 | 0·10 |
| 33 | " | 0·00 | ..... |
| 34 | " | 0·00 | ..... |
| 35 | " | 0·79 | 0·10 |
| 36 | " | 0·00 | ..... |
| 37 | " | 0·64 | ..... |
| 38 | " | 0·00 | ..... |
| 39 | " | 1·26 | 0·10 |
| 40 | No. 1 open-cut | 2·43 | ..... |
| 41 | No. 2 " | 0·58 | ..... |
| 42 | Ontcrop | 0·00 | 0·10 |
| 43 | No. 3 trench | 0·21 | ..... |
| 44 | No. 4 " | 0·10 | ..... |
| 45 | " | 0·00 | ..... |
| 46 | " | 0·00 | ..... |

Results of assays made, &c.—*continued.*

| Number of Sample | Name of Mine and Locality. | Tin per cent. | Bismuth per cent. |
|----------------------------------|----------------------------|---------------|-------------------|
| <i>Lone Hand Mine—continued.</i> | | | |
| 47 | No. 5 " | 0.32 | ..... |
| 48 | Nos. 6 and 7 trenches..... | 0.00 | ..... |
| 49 | No. 3 shaft | 0.17 | 0.10 |
| 50 | " | 0.10 | ..... |
| 51 | " | 0.10 | ..... |
| 52 | " | 0.14 | ..... |
| 53 | " | 0.10 | ..... |
| 54 | " | 0.10 | ..... |
| 55 | " | 0.10 | ..... |
| <i>Titanic Mine—</i> | | | |
| 53 | No. 1 shaft | *0.55 | *0.25 |
| 57 | " | 0.27 | 0.25 |
| 58 | " | 0.76 | 0.25 |
| 59 | " | 1.80 | 0.25 |
| 60 | " | 0.89 | 0.25 |
| 61 | " | 0.28 | 0.25 |
| 62 | " | 0.10 | 0.25 |
| <i>Leviathan Mine—</i> | | | |
| 63 | No. 1 shaft | 0.10 | ..... |
| 64 | " | 0.20 | 0.25 |
| 65 | " | 0.00 | 0.25 |
| 66 | " | 0.27 | 0.25 |
| 67 | " | 0.00 | 0.25 |
| 68 | No. 2 " | 0.12 | 0.25 |
| 69 | " | 0.18 | ..... |
| <i>Bulgarian Mine—</i> | | | |
| 70 | No. 1 shaft | 0.73 | ..... |
| 71 | " | 0.00 | ..... |
| 72 | " open-cut | 0.33 | ..... |
| 73 | " | 0.48 | ..... |
| 74 | No. 2 " | trace. | ..... |
| 75 | No. 1 trench..... | 0.99 | ..... |
| 76 | " | 1.36 | ..... |
| 77 | No. 2 " | trace. | ..... |
| <i>Empire Mine—</i> | | | |
| 78 | Nos. 1 and 2 trenches..... | 1.06 | ..... |
| 79 | No. 2 trench..... | 0.39 | ..... |
| 80 | No. 3 " | 0.10 | ..... |
| 81 | Nos. 4 and 5 trenches..... | 0.27 | ..... |
| 82 | No. 6 trench..... | trace. | ..... |
| 83 | No. 1 shaft | 2.50 | ..... |
| 84 | " | 4.98 | ..... |
| 85 | " | 6.41 | ..... |
| 86 | No. 1 shaft | 1.71 | ..... |
| 87 | " | 1.05 | ..... |
| 88 | " | 1.19 | ..... |
| 89 | " | 0.62 | ..... |

NOTE.—The mark * in * indicates that the assay value is less than that shown.

Results of assays made, &c.—*continued.*

| Number of Sample. | Name of Mine and Locality. | Tin per cent. | Bismuth per cent. |
|-------------------|--------------------------------|---------------|-------------------|
| | <i>Empire Mine—continued.</i> | | |
| 90 | No. 1 shaft | 0 09 | ..... |
| 91 | „ | 0·14 | ..... |
| 92 | „ | 0·85 | ..... |
| 93 | „ | 0·55 | ..... |
| 94 | „ | 0·50 | ..... |
| 95 | „ | 1·46 | ..... |
| 96 | No. 2 shaft | trace. | ..... |
| 97 | „ | 0·11 | ..... |
| 98 | „ | trace. | ..... |
| | <i>Clark's Mine—</i> | | |
| 99 | No. 1 shaft | 0·98 | ..... |
| 100 | Drive from No. 1 to No. 2..... | 1·07 | ..... |
| 101 | No. 1 trench | trace. | ..... |
| | <i>Dumbrell's Bygoo—</i> | | |
| 102 | No. 2 shaft | 0 28 | ..... |
| 103 | No. 6 trench | trace. | ..... |
| 104 | No. 4 shaft | 2·80 | ..... |
| 105 | „ | 3·44 | ..... |
| 106 | „ | 1·53 | ..... |
| 107 | „ | 0·89 | ..... |
| 108 | No. 7 trench | 1·51 | ..... |
| 109 | No. 12 „ | 1·73 | ..... |
| | <i>Corner's Mine—</i> | | |
| 110 | No. 1 shaft | 29·31 | ..... |
| 111 | „ | 37·30 | ..... |
| 112 | „ | 1·55 | ..... |
| 113 | No. 2 shaft | 3·10 | ..... |
| 114 | „ | trace. | ..... |
| 115 | No. 2 trench | 0·93 | ..... |
| | <i>Schulz's Mine—</i> | | |
| 116 | No. 1 shaft | 0 35 | ..... |
| 117 | „ | 2 25 | ..... |
| 118 | „ | trace. | ..... |
| 119 | „ ..... | „ | ..... |
| 120 | „ | 0·84 | ..... |
| 121 | No. 2 shaft | * 0·54 | ..... |
| | <i>Murphy's Mine—</i> | | |
| 122 | No. 2 shaft | trace. | ..... |
| 123 | No. 1 shaft ..... | „ | ..... |
| 124 | „ ..... | „ | ..... |
| 125 | „ ..... | „ | ..... |
| 126 | „ ..... | „ | ..... |
| 127 | No. 4 shaft ..... | „ | ..... |
| 128 | No. 3 shaft ..... | „ | ..... |
| 129 | „ ..... | „ | ..... |

Results of assays made, &c.—*continued.*

| Number of Sample | Name of Mine and Locality: | Tin, per cent. | WO ₃ , per cent. |
|-------------------|----------------------------|----------------|-----------------------------|
| Needlewood Mine— | | | |
| 130 | S.W. drive | 0.83 | ..... |
| 131 | „ | 1.16 | ..... |
| 132 | „ | 0.31 | ..... |
| 133 | „ | *0.10 | ..... |
| 134 | N. drive | 0.23 | ..... |
| 135 | S.E. „ | 0.15 | ..... |
| 136 | N.W. „ | *0.10 | ..... |
| Buchanan's Mine— | | | |
| 137 | No. 1 trench | 0.61 | *0.05 |
| 138 | „ | 0.65 | *0.05 |
| 139 | „ | 0.22 | *0.05 |
| 140 | No. 2 trench | *0.10 | 0.07 |
| 141 | No. 3 „ | *0.10 | 0.31 |
| 142 | No. 5 „ | *0.10 | 0.26 |
| 143 | „ | *0.10 | 0.13 |
| 144 | „ | *0.10 | 0.19 |
| Mahony's Mine— | | | |
| 145 | No. 1 trench | 1.21 | *0.05 |
| 146 | No. 2 „ | 2.42 | *0.05 |
| 147 | No. 3 „ | 1.45 | *0.05 |
| 148 | No. 4 „ | 0.98 | *0.05 |
| 149 | No. 5 „ | 0.78 | *0.05 |
| 150 | No. 6 „ | 0.49 | ..... |
| 151 | No. 1 shaft | trace. | ..... |
| 152 | No. 2 „ | 0.54 | ..... |
| 153 | No. 7 trench | 0.57 | ..... |
| Rob Roy Mine— | | | |
| 154 | N. drive | 0.44 | ..... |
| 155 | „ | trace. | ..... |
| 156 | „ | 0.28 | ..... |
| 157 | S. end of shaft | 0.20 | ..... |
| 158 | N. „ | trace. | ..... |
| 159 | „ ..... | „ | ..... |
| 160 | „ ..... | „ | ..... |
| McDermott's Mine— | | | |
| 161 | No. 1 trench ..... | „ | ..... |
| 162 | „ ..... | „ | ..... |
| 163 | „ ..... | „ | ..... |
| 164 | No. 4 trench ..... | „ | ..... |

NOTE.—The mark * indicates that the assay value is less than that shown.

Results of assays made, &c.—*continued.*

| Number of Samples. | Name of Mine and Locality. | Tin per cent. | Tungstic Acid per cent. | Copper per cent. | Bi-smuth per cent. |
|--------------------|---------------------------------|---------------|-------------------------|------------------|--------------------|
| Cox's Mine— | | | | | |
| 165 | No. 1 shaft | 1·55 | ..... | ..... | ..... |
| 166 | " | 0·56 | ..... | ..... | ..... |
| 167 | " | 0·11 | ..... | ..... | ..... |
| 168 | " | 0·56 | ..... | ..... | ..... |
| Outcast Mine— | | | | | |
| 169 | No. 14 trench | trace. | trace. | ..... | ..... |
| 170 | " ..... | " | ..... | ..... | ..... |
| 171 | No. 13 " | 0·52 | ..... | ..... | ..... |
| 172 | " | trace. | ..... | ..... | ..... |
| 173 | No. 1 shaft..... | 0·11 | ..... | ..... | ..... |
| 174 | " | trace. | ..... | ..... | ..... |
| 175 | " | 0·20 | ..... | ..... | ..... |
| 176 | " | trace. | ..... | ..... | ..... |
| 177 | " ..... | " | ..... | ..... | ..... |
| 178 | " | 0·51 | ..... | ..... | ..... |
| 179 | " | trace. | ..... | ..... | ..... |
| 180 | No. 15 trench..... | 0·19 | ..... | ..... | ..... |
| 181 | " | trace. | ..... | ..... | ..... |
| 182 | Outcrop at B..... | 0·92 | present. | ..... | present. |
| 183 | " A..... | trace. | ..... | ..... | ..... |
| 184 | " C..... | 0·42 | ..... | ..... | ..... |
| 185 | " D..... | trace. | ..... | ..... | ..... |
| 186 | " E..... | " | trace. | ..... | ..... |
| 187 | " F..... | 0·38 | ..... | ..... | ..... |
| 188 | No. 9 trench | trace. | ..... | ..... | ..... |
| 189 | No. 10 " | 0·65 | ..... | ..... | ..... |
| Welcome Stranger— | | | | | |
| 190 | No. 2 shaft..... | 0·32 | ..... | ..... | ..... |
| Perseverance Mine— | | | | | |
| 191 | No. 1 shaft..... | trace. | 1·35 | ..... | ..... |
| 192 | " | " | trace. | ..... | ..... |
| 193 | " | 2·87 | ..... | ..... | ..... |
| 194 | " | trace. | ..... | ..... | ..... |
| 195 | " ..... | " | ..... | ..... | ..... |
| 196 | " ..... | " | ..... | ..... | ..... |
| 197 | " ..... | " | ..... | ..... | ..... |
| 198 | " ..... | " | ..... | ..... | ..... |
| Kia-ora Mine— | | | | | |
| 199 | Shaft ..... | " | ..... | ..... | ..... |
| Austral— | | | | | |
| 200 | Shaft | 0·79 | ..... | 0·58 | 0·02 |
| 201 | " | 1·83 | ..... | 0·77 | 0·45 |
| 202 | Nos. 1, 2, and 3 trenches | trace. | ..... | ..... | ..... |
| 203 | Nos. 4 and 5 trenches..... | " | ..... | ..... | ..... |
| 204 | No. 6 trench ..... | " | ..... | ..... | ..... |

Results of assays made, &c.—*continued.*

| Number of Sample. | Name of Mine and Locality. | Tin per cent. | Tungstic Acid per cent. | Copper per cent. | Bismuth per cent. |
|-------------------|----------------------------|---------------|-------------------------|------------------|-------------------|
| | Black and White— | | | | |
| 205 | No. 1 shaft..... | .. | ..... | ..... | ..... |
| 206 | .. | .. | | | |
| 207 | .. | .. | | | |
| 208 | .. | .. | | | |
| 209 | .. | .. | | | |
| 210 | .. | .. | | | |
| 211 | .. | .. | | | |
| 212 | .. | .. | | | |
| 213 | .. | *0.10 | ..... | ..... | ..... |
| 214 | .. | trace. | ..... | ..... | ..... |
| 215 | .. | .. | | | |
| 216 | .. | .. | | | |
| 217 | .. | .. | | | |
| 218 | .. dump..... | .. | ..... | ..... | ..... |
| 219 | No. 2 trench..... | 0.18 | ..... | ..... | ..... |
| 220 | .. | trace. | ..... | ..... | ..... |
| 221 | No. 4 open cut..... | .. | ..... | ..... | ..... |
| 222 | .. | .. | | | |
| 223 | .. | .. | | | |
| 224 | .. | 0.40 | ..... | ..... | ..... |
| 225 | .. | 0.38 | ..... | ..... | ..... |
| 226 | .. | trace. | ..... | ..... | ..... |
| 227 | .. | .. | | | |
| 228 | .. | 0.13 | ..... | ..... | ..... |
| 229 | .. | trace. | ..... | ..... | ..... |
| 230 | .. | 0.19 | ..... | ..... | ..... |
| 231 | .. | trace. | *0.05 | ..... | ..... |
| 232 | .. | *0.10 | ..... | ..... | ..... |
| 233 | .. | 2.84 | ..... | ..... | ..... |
| 234 | .. | 0.49 | ..... | ..... | ..... |
| 235 | .. | 1.10 | ..... | ..... | ..... |
| 236 | .. | 0.54 | ..... | ..... | ..... |
| 237 | No. 3 trench..... | trace. | ..... | ..... | ..... |
| 238 | No. 2 shaft..... | .. | ..... | ..... | ..... |
| 239 | .. | .. | | | |
| 240 | .. | .. | | | |
| 241 | .. | .. | | | |
| 242 | .. | .. | | | |
| 243 | .. | .. | | | |
| 244 | .. | .. | | | |
| 245 | .. | 1.30 | ..... | ..... | ..... |
| 246 | .. | trace. | ..... | ..... | ..... |
| 247 | No. 5 trench..... | 0.10 | ..... | ..... | ..... |
| 248 | .. | 0.94 | ..... | ..... | ..... |
| 249 | No. 3 shaft..... | 0.26 | ..... | ..... | ..... |

NOTE.—The mark * indicates that the assay value is less than that shown.

Results of Assays, made &c.—*continued.*

| Number of Sample. | Name of Mine and Locality. | Tin. per cent. | Lead. per cent. | Tungstic Acid. per cent. |
|------------------------------------|----------------------------|----------------|-----------------|--------------------------|
| Black and White— <i>continued.</i> | | | | |
| 250 | No. 3 shaft | 0 11 | ..... | ..... |
| 251 | " | 1 64 | ..... | ..... |
| 252 | " | 0 41 | ..... | ..... |
| 253 | " | 1 54 | ..... | ..... |
| 254 | " | 1 71 | ..... | ..... |
| 255 | " | 0 98 | ..... | ..... |
| 256 | " | 0 10 | ..... | ..... |
| 257 | " | trace. | ..... | ..... |
| 258 | " | 2 42 | ..... | ..... |
| 259 | " | 1 96 | ..... | ..... |
| 260 | " | 0 35 | ..... | ..... |
| Lone Hand Mine.— | | | | |
| 261 | Special Dump Sample. | 1 42 | ..... | ..... |
| Homeward Bound— | | | | |
| 262 | Main Drive | 1 89 | ..... | ..... |
| 263 | " | trace. | ..... | ..... |
| 264 | " | 5 42 | trace. | ..... |
| 265 | " | 4 38 | " | ..... |
| 266 | " | 0 81 | ..... | ..... |
| 267 | " | 0 21 | ..... | ..... |
| 268 | " | trace. | ..... | ..... |
| 269 | " ..... | " | ..... | ..... |
| 270 | " | 0 11 | ..... | ..... |
| 271 | " | 4 82 | ..... | ..... |
| 272 | " | 0 10 | ..... | ..... |
| 273 | " | 0 68 | ..... | ..... |
| 274 | " | 1 64 | ..... | ..... |
| 275 | " | 1 17 | ..... | ..... |
| 276 | " | 0 16 | ..... | ..... |
| 277 | " | 10 31 | ..... | ..... |
| 278 | " | 5 79 | ..... | ..... |
| 279 | " | 21 53 | 5 70 | ..... |
| 280 | " | 0 26 | 2 62 | ..... |
| 281 | " | 0 94 | 0 10 | ..... |
| 282 | " | 5 98 | 5 90 | ..... |
| 283 | " | 4 16 | 5 99 | ..... |
| 284 | No. 2 shaft | 18 10 | 3 83 | ..... |
| 285 | " | 6 43 | 0 96 | ..... |
| 286 | " | 15 77 | 0 64 | ..... |
| 287 | No. 1 shaft | 0 39 | ..... | ..... |
| 288 | " | 3 51 | ..... | ..... |
| 289 | " | 28 22 | 0 49 | ..... |
| 290 | " | 0 51 | 0 10 | ..... |
| 291 | " | 0 14 | 1 00 | ..... |
| 292 | " | 5 38 | 1 00 | ..... |
| 293 | " | 0 20 | 1 96 | ..... |
| 294 | No. 1 rise | 3 51 | 5 32 | ..... |
| 295 | " | 0 84 | trace. | ..... |
| 296 | " | 1 81 | " | ..... |
| 297 | " | 9 46 | " | ..... |
| 298 | " | 18 78 | " | ..... |
| 299 | " | 12 02 | " | ..... |

Results of Assays made, &c.—*continued.*

| Number of Samples. | Name of Mine and Locality. | Tin per cent. | Lead per cent. | Tungstic Acid per cent. |
|--------------------|----------------------------|---------------|----------------|-------------------------|
| 300 | No. 1 rise | 5.28 | ... | ..... |
| 301 | " | 0.58 | ... | ..... |
| 302 | No. 2 rise | 5.79 | 1.08 | ..... |
| 303 | " | 1.64 | 2.11 | ..... |
| 304 | " | 10.12 | 3.91 | ..... |
| 305 | " | 21.82 | 0.91 | ..... |
| 306 | " | 9.78 | 4.31 | ..... |
| 307 | " | 13.01 | 2.16 | ..... |
| 308 | " | 3.60 | 0.93 | ..... |
| 309 | No. 1 Open Cut..... | 0.21 | 0.31 | ..... |
| 310 | " | 1.61 | trace | ..... |
| 311 | " | 1.33 | " | ..... |
| 312 | " | 0.91 | " | ..... |
| 313 | " | 0.89 | 0.51 | ..... |
| Wallis's Mine.— | | | | |
| 314 | No. 2 shaft | 3.52 | ..... | ..... |
| 315 | " | 0.81 | trace. | ..... |
| 316 | " | 0.56 | " | ..... |
| 317 | " | 0.32 | ..... | present. |
| 318 | " | 3.48 | 0.20 | 0.10 |
| 319 | " | 4.18 | trace. | ..... |
| 320 | " | 0.53 | ..... | ..... |
| 321 | " | 0.91 | ..... | ..... |
| 322 | No. 1 shaft | 8.84 | ..... | ..... |
| 323 | " | 7.39 | ..... | ..... |
| 324 | " | 4.28 | ..... | ..... |
| 325 | " | 7.79 | trace. | ..... |
| 326 | " | 3.94 | " | ..... |
| 327 | " | 2.30 | " | ..... |
| 328 | " | 1.02 | " | ..... |
| 329 | No. 1 open cut | 0.12 | " | ..... |
| 330 | " | 0.33 | " | ..... |
| 331 | " | 0.52 | " | ..... |
| 332 | No. 3 shaft | trace. | " | ..... |
| 333 | " | 0.12 | ..... | ..... |
| Champion Mine.— | | | | |
| 334 | No. 1 open cut | trace. | ..... | ..... |
| 335 | " ..... | " | ..... | ..... |
| 336 | " ..... | " | ..... | ..... |
| 337 | " | 0.12 | ..... | ..... |
| 338 | " | 0.15 | ..... | ..... |
| 339 | " | 0.32 | ..... | ..... |
| 340 | " | trace. | ..... | ..... |

Results of Assays made, &c.—*continued.*

| Number of Sample. | Name of Mine and Locality. | Tin per cent. |
|-------------------|----------------------------|---------------|
| | Champion Mine— | |
| 341 | No. 1 open-cut | trace |
| 342 | „ | 0·11 |
| 343 | „ | trace |
| 344 | No. 1 shaft | 6·05 |
| 345 | „ | 8·49 |
| 346 | No. 2 open-cut | 0·14 |
| | Ardlethan Options— | |
| 347 | No. 1 open-cut | 0·48 |
| 348 | „ | 0·91 |
| 349 | „ | 1·94 |
| 350 | No. 2 open-cut | trace. |
| 351 | „ | „ |
| | Jackson's South Mine— | |
| 352 | Alluvial shaft | 0·67 |
| 353 | „ | 0·23 |
| 354 | „ | 0·10 |
| 355 | „ | trace. |

NOTE.—Samples 344 and 345 contain arsenic.

Results of Assays made, &c.—*continued.*

| Number of Sample. | Name of Mine and Locality. | Tin per cent. | Copper per cent. | Lead per cent. | Bismuth per cent. | Tungstic Acid per cent. | Titanic Acid per cent. | Arsenic. |
|-------------------|----------------------------|---------------|------------------|----------------|-------------------|-------------------------|------------------------|----------|
| Frew's Mine— | | | | | | | | |
| 398 | No. 3 shaft | trace. | ..... | ..... | ..... | ..... | ..... | ..... |
| 399 | " | 0·11 | ..... | ..... | ..... | ..... | ..... | ..... |
| 400 | " | 0·28 | ..... | ..... | ..... | ..... | ..... | ..... |
| 401 | " | 0·55 | ..... | ..... | ..... | ..... | ..... | ..... |
| 402 | No. 4 shaft | 0·64 | ..... | ..... | ..... | ..... | ..... | ..... |
| 403 | No. 2 " | 0·23 | ..... | ..... | ..... | ..... | ..... | ..... |
| 404 | No. 1 " | trace. | ..... | ..... | ..... | ..... | ..... | ..... |
| Matheson's Mine— | | | | | | | | |
| 405 | No. 1 trench | trace. | ..... | ..... | ..... | ..... | ..... | ..... |
| 406 | No. 2 " ..... | " | ..... | ..... | ..... | ..... | ..... | ..... |
| 407 | No. 3 " | 0·18 | ..... | ..... | ..... | ..... | ..... | ..... |
| 408 | No. 4 " | 0·09 | ..... | ..... | ..... | ..... | ..... | ..... |
| 409 | Shaft | 0·14 | ..... | ..... | ..... | ..... | ..... | ..... |
| 410 | " | 0·56 | present. | ..... | ..... | ..... | ..... | ..... |
| 411 | " | 0·12 | " | ..... | ..... | ..... | ..... | ..... |
| Carpathia Mine— | | | | | | | | |
| 412 | No. 3 shaft | 2·85 | trace. | 0·25 | ..... | ..... | trace. | ..... |
| 413 | " | 18·70 | ..... | ..... | ..... | 2·80 | ..... | ..... |
| 414 | " | 13·93 | ..... | ..... | ..... | ..... | ..... | ..... |
| 415 | " | 3·44 | ..... | ..... | ..... | ..... | trace. | ..... |
| 416 | " | 42·93 | ..... | ..... | ..... | ..... | ..... | ..... |
| 417 | " | 8·83 | ..... | ..... | ..... | ..... | trace. | ..... |
| 418 | No. 1 shaft, S. stope ... | 1·10 | ..... | ..... | ..... | ..... | ..... | ..... |
| 419 | " N. " | 0·76 | 0·10 | ..... | ..... | ..... | ..... | ..... |
| 420 | " N. end ... | 4·56 | trace. | ..... | 0·17 | ..... | ..... | ..... |
| 421 | " " | 15·14 | " | ..... | ..... | ..... | trace. | ..... |
| 422 | " " | 3·34 | " | ..... | ..... | ..... | " | ..... |
| 423 | " " | 7·11 | " | ..... | 0·31 | 0·52 | " | ..... |
| 424 | " " | 24·11 | 0·20 | ..... | 0·74 | 2·25 | " | ..... |
| 425 | " " | 12·90 | 0·20 | ..... | 0·95 | 2·20 | ..... | ..... |
| 426 | " N. stope ... | 0·29 | trace. | ..... | trace. | ..... | ..... | ..... |
| 427 | " " | 0·21 | " | ..... | 0·47 | ..... | ..... | ..... |
| 428 | No. 4 shaft | 7·31 | 0·40 | 0·69 | ..... | ..... | trace. | ..... |
| 429 | " | 4·97 | 0·55 | 0·42 | ..... | ..... | " | ..... |
| 430 | " | 2·67 | 2·07 | 0·38 | ..... | ..... | " | ..... |
| 431 | " | 10·62 | 2·67 | 2·97 | trace. | 6·11 | " | ..... |

NOTE.—Carpathia Mine, No. 4 shaft returned 6·00 average value of 172 bulk parcels.

| | | | | |
|---------------|------|---|-----|---|
| No. 2 " | 6·00 | " | 84 | " |
| No. 5 " | 4·16 | " | 117 | " |

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